WORKS OF
PROFESSOR CECIL H. PEABODY

PUBLISHED BY

JOHN WILEY & SONS.

Thermodynamics of the Steam-engine and other Heat-engines.

This work is intended for the use of students in technical schools, and gives the theoretical training required by engineers. 8vo, cloth, $[illegible].

Tables of the Properties of Saturated Steam and other Vapors.

These tables were prepared for the use of students in technical schools and colleges, and of engineers in general. 8vo, cloth, $1.00.

Valve-gears for Steam-engines.

This book is intended to give engineering students instruction in the theory and practice of designing valve-gears for steam-engines. 8vo, cloth, $2.50.

Steam-boilers.

By Prof. CECIL H. PEABODY and Prof. EDWARD F. MILLER. Nearly 400 pages; 142 illustrations. 8vo, cloth, $4.00.

TABLES OF THE PROPERTIES OF

SATURATED STEAM

AND OTHER VAPORS.

BY

CECIL H. PEABODY,

Professor of Marine Engineering and Naval Architecture,
Massachusetts Institute of Technology.

SIXTH EDITION, REVISED AND ENLARGED.

FOURTH THOUSAND.

NEW YORK:
JOHN WILEY & SONS.

SATURATED STEAM, AND OTHER VAPORS.

A COMPARISON of the several tables of the properties of saturated steam, expressed in English units, reveals discrepancies of considerable magnitude; and investigation shows that, while all are in some manner founded on the experiments of Regnault, various methods of calculation have been used, and in some cases other experimental data have been employed. A review of the whole subject, in connection with the preparation of notes on thermodynamics for the use of the students of the Massachusetts Institute of Technology, made it seem important to calculate a set of tables, to accompany those notes, founded on the best and most recent data.

In presenting the tables for general use, it appears proper to state in full the data and the methods of calculation employed, so that each one may see the degree of accuracy and correctness of the tables, and the reliance to be placed on them.

Tables of the properties of other vapors have been added, which will be discussed hereafter.

Pressure of Saturated Steam. — As a conclusion from all the experiments on the tension of saturated steam, Regnault gives, in the *Mémoires de l'Institut de France, etc., Tome XXI.*, the following data: —

TEMPERATURE C.	PRESSURE MM. OF MERCURY.
—32	0.32
—16	1.29
0	4.60
25	23.55
50	91.98
75	288.50
100	760.00
130	2030.0
160	4651.6
190	9426.
220	17390.

From these data he calculated, by the aid of seven-place logarithms, the following formulæ, which give the pressure in millimetres of mercury for any temperature in degrees Centigrade: —

A. For steam from $-32°$ to $0°$ C.

$$p = a + b\alpha^n.$$
$$a = -0.08038.$$
$$\log b = 9.6024724 - 10.$$
$$\log \alpha = 0.033398.$$
$$n = 32° - t.$$

B. For steam from $0°$ to $100°$ C.

$$\log p = a - b\alpha^n + c\beta^n.$$
$$a = 4.7384380.$$
$$\log b = 0.6116485.$$
$$\log c = 8.1340339 - 10.$$
$$\log \alpha = 9.9967249 - 10.$$
$$\log \beta = 0.006865036.$$
$$n = t.$$

C. For steam from $100°$ to $220°$ C.

$$\log p = a - b\alpha^n + c\beta^n.$$
$$a = 5.4583895.$$
$$\log b = 0.4121470.$$
$$\log c = 7.7448901 - 10.$$
$$\log \alpha = 9.997412127 - 10.$$
$$\log \beta = 0.007590697.$$
$$n = t - 100.$$

D. For steam from $-20°$ to $220°$ C.

$$\log p = a - b\alpha^n - c\beta^n.$$
$$a = 6.2640348.$$
$$\log b = 0.1397743.$$
$$\log c = 0.6924351.$$
$$\log \alpha = 9.994049292 - 10.$$
$$\log \beta = 9.998343862 - 10.$$
$$n = t + 20.$$

By aid of the formulæ *A* and *B*, Regnault calculated and recorded tables of the pressures of saturated steam for temperatures from $-32°$ to $100°$ C. The formula *D* was calculated from the data given above for the temperatures $-20°$, $+40°$, $100°$, $160°$, and $220°$ C., and was intended to represent the whole range of experiments. By this formula, instead of formula *C*, he calculated the pressures set down in his tables for temperatures from $100°$ C. to $220°$ C.

that differ but little from those that will be given later. Some of the more recent tables in the French system were calculated by his equations.

Equations for the Pressure of Steam at Paris. — In view of the preceding statements, it appeared desirable to re-calculate the constants for Equations B and C, with a degree of accuracy that should exclude any doubt as to the reliability of the results. Accordingly, the logarithms required were taken from Vega's ten-place table, and then the remainder of the calculations were carried on with natural numbers, checking by independent methods, with the following results: —

B. For steam from 0° to 100° C.

$$\log p = a - b\alpha^n + c\beta^n.$$
$$a = 4.7393622142.$$
$$\log b = 0.6117400190.$$
$$\log c = 8.1320378383 - 10.$$
$$\log \alpha = 9.996725532820 - 10.$$
$$\log \beta = 0.006864675924.$$
$$n = t.$$

C. For steam from 100° to 220° C.

$$\log p = a - b\alpha^n + c\beta^n.$$
$$a = 5.4574301234.$$
$$\log b = 0.4119787931.$$
$$\log c = 7.7417476470 - 10.$$
$$\log \alpha = 9.99741106346 - 10.$$
$$\log \beta = 0.007642489113.$$
$$n = t - 100.$$

To show the degree of accuracy attained, the following tables are given: —

EQUATION B.

t.	p.	LOG p FROM TABLE OF LOGARITHMS.	LOG p CALCULATED BY EQUATION.
0	4.60	0.6627578317	....
25	23.55	1.3719909115	1.37199097
50	91.98	1.9636934052	1.96369346
75	288.50	2.4601458175	2.46014587
100	760	2.8808135923	2.88081365

EQUATION C.

t.	p.	LOG p FROM TABLE OF LOGARITHMS.	LOG p CALCULATED BY EQUATION.
100	760.00	2.8808135923	....

C and the numerical work was not carried to so large a number of decimal places. For the calculation of tables, the constants are carried to seven places of significant figures only; this gives six significant figures in the result, of which five are recorded in the table.

Pressure of Steam at Latitude 45°. — French System. — It is customary to reduce all measurements to the latitude of 45°, and to sea-level. The standard thermometer should then have its boiling and freezing points determined under, or reduced to such conditions. The value of g, the acceleration due to gravity, is, at Paris, latitude 48° 50′ 14″ and 60 metres above sea-level, 9.809218 metres; and at 45°, and at sea-level, it is 9.806056 metres. Consequently, 760 mm. of mercury at 45° gives a pressure equal to that of 759.755 mm. at Paris; and this corresponds to a temperature of 99.°991 C.

In other words, the thermometer which is standard at 45° has each degree 0.99991 of the length of the degree of a thermometer standard at Paris.

To reduce Equation B to 45° latitude, we have

$$\log p = a + \log \frac{980.9218}{980.6056} - b\alpha^{0.99991t} + c\beta^{0.99991t};$$

and for Equation C,

$$\log p = a + \log \frac{980.9218}{980.6056} - b\alpha^{(0.99991t - 100)} + c\beta^{(0.99991t - 100)}$$

$$= a + \log \frac{980.9218}{980.6056} - b\alpha^{-0.009}\,\alpha^{0.99991\,(t-100)} + c\beta^{-0.009}\,\beta^{0.99991\,(t-100)}.$$

The resulting equations which were used in calculating Table III are

B. For steam from 0° to 100° C. at 45° latitude.

$$\begin{aligned}
\log p &= a_1 - b\alpha_1^{\,n} + c\beta_1^{\,n}.\\
a_1 &= 4.739502.\\
\log b &= 0.6117400.\\
\log c &= 8.13204 - 10.\\
\log \alpha_1 &= 9.996725828 - 10\\
\log \beta_1 &= 0.0068641.\\
n &= t.
\end{aligned}$$

C. For steam from 100° to 220° C. at 45° latitude.

$$\begin{aligned}
\log p &= a_1 - b_1\alpha_1^{\,n} + c_1\beta_1^{\,n}.\\
a_1 &= 5.457570.\\
\log b_1 &= 0.4120021.\\
\log c_1 &= 7.74168 - 10.\\
\log \alpha_1 &- 9.997411296 - 10.\\
\log \beta_1 &= 0.0076418.\\
n &= t - 100.
\end{aligned}$$

equations for the pressure of steam, so that they will give the pressures in pounds on the square inch for degrees Fahrenheit, there are required the comparison of measures of length, and of weight, the comparison of the scales of the thermometers, and the specific gravity of mercury.

Professor Rogers (*Proceedings of the Am. Acad. of Arts and Sciences, 1882–83*, also *Additional Observations*, etc.) gives for the length of the metre, 39.3702 inches. This differs from the value given by Capt. Clarke (*Proceedings of the Royal Society, vol. xv., 1866*), by an amount that does not affect the values in the tables; his value being 39.370432 inches.

Professor Miller (*Phil. Transactions, cxlvi., 1856*) gives for the weight of one kilogram, 2.20462125 pounds.

Regnault gives, for the weight of one litre of mercury, 13.5959 kilograms.

The degree Fahrenheit is $\frac{5}{9}$ of the length of the degree Centigrade.

Let
$$k = \frac{13.5959 \times 2.204621}{39.3702^2};$$
then the equations B and C have for the reduction to degrees Fahrenheit, and pounds on the square inch,

$$\log p = a_1 + \log k - b\alpha^{\frac{5}{9}n} + c\beta^{\frac{5}{9}n},$$
$$\log p = a_1 + \log k - b_1\alpha_1^{\frac{5}{9}n} + c_1\,\beta_1^{\frac{5}{9}n}.$$

The resulting equations, which were used in calculating Tables I and II, are: —

B. For steam from 32° to 212° F., in pounds on the square inch.

$$\begin{aligned}
\log p &= a_2 - b\alpha_2^{\,n} + c\beta_2^{\,n}.\\
a_2 &= 3.0259908.\\
\log b &= 0.6117400.\\
\log c &= 8.13204 - 10.\\
\log \alpha_2 &= 9.998181015 - 10.\\
\log \beta_2 &= 0.0038134.\\
n &= t - 32.
\end{aligned}$$

C. For steam from 212° to 428° F., in pounds on the square inch.

$$\begin{aligned}
\log p &= a_2 - b_1\alpha_2^{\,n} + c_1\beta_2^{\,n}.\\
a_2 &= 3.743976.\\
\log b_1 &= 0.4120021.\\
\log c_1 &= 7.74168 - 10.\\
\log \alpha_2 &= 9.998561831 - 10.\\
\log \beta_2 &= 0.0042454.\\
n &= t - 212.
\end{aligned}$$

All of the foregoing equations make the pressure a function of the tem-

Other Equations for the Pressure of Steam. — Rankine, in his *Steam Engine and other Prime Movers*, gives the following equation: —

$$\log p = A - \frac{B}{T} - \frac{C}{T^2}.$$

For pounds on the square inch, corresponding to degrees Fahrenheit, —

$$A = 6.1007.$$
$$\log B = 3.43642.$$
$$\log C = 5.59873.$$
$$T = t + 461.^\circ 2 \text{ F}.$$

This equation has been largely used for calculating tables on the English system. The following table will give a comparison between the results from this formula and those from Formulæ B and C.

TEMPERATURE.	PRESSURE.	
	Regnault at 45° latitude.	Rankine.
32	0.0890	0.083
77	0.4555	0.452
122	1.7789	1.78
167	5.579	5.58
212	14.99	14.70
257	33.711	33.71
302	69.27	69.21
347	129.79	129.8
392	225.56	225.9
428	336.26	336.3

Differential Co-efficient $\frac{dp}{dt}$. — As will be seen later, the differential co-efficient $\frac{dp}{dt}$ is used in calculating the volume and density of saturated vapors.

From the general equation of the form,

$$\log p = a + b\alpha^n + c\beta^n,$$

differentiation gives

$$\frac{1}{p}\frac{dp}{dt} = \frac{1}{M^2} b \log \alpha \cdot \alpha^n + \frac{1}{M^2} c \log \beta \cdot \beta^n,$$

in which M is the modulus of the common system of logarithms.

The equation may be written, —

$$\frac{1}{p}\frac{dp}{dt} = A\alpha^n + B\beta^n.$$

French units.

B. For 0° to 100° C., mm. of mercury,

$$\log A = 8.8512729 - 10.$$
$$\log B = 6.69305 - 10.$$
$$\log \alpha_1 = 9.996725828 - 10.$$
$$\log \beta_1 = 0.0068641.$$

C. For 100° to 220° C., mm. of mercury.

$$\log A = 8.5495158 - 10.$$
$$\log B = 6.34931 - 10.$$
$$\log \alpha_1 = 9.997411296 - 10.$$
$$\log \beta_1 = 0.0076418.$$

English units.

B. For 32° to 212° F., pounds on the square inch.

$$\log A = 8.5960005 - 10.$$
$$\log B = 6.43778 - 10.$$
$$\log \alpha_2 = 9.998181015 - 10.$$
$$\log \beta_2 = 0.0038134.$$

C. For 212° to 428° F., pounds on the square inch,

$$\log A = 8.2942434 - 10.$$
$$\log B = 6.09403 - 10.$$
$$\log \alpha_2 = 9.998561831 - 10.$$
$$\log \beta_2 = 0.0042454.$$

Heat of the Liquid and Specific Heat. — A preliminary series of experiments convinced Regnault that the specific heat of water at low temperature is unity. To test the specific heat at higher temperatures, he ran hot water from a boiler, and at a known temperature, into a calorimeter in which the temperature varied from 8° to 14° C., and the resulting upper temperature varied from 17° to 29° C. Knowing the original weight of water in the calorimeter, the weight run in from the boiler, and the initial and final temperatures in the calorimeter, he calculated the mean specific heat of water between the temperature of the boiler and the final temperatures of the calorimeter. A series of forty such experiments was made, with the temperature of the boiler varying from 108° to 192° C., from which Regnault concluded that the mean specific neat from 0° to 100° is 1.005; and from 0° to 200°, 1.016. The corresponding heat of the liquid, i.e., the heat required to raise one kilogram of water from 0° to a given temperature, t, is

For 100° 100.5

and solving for the two constants by aid of the two known values of q, the following equation, which is commonly used, is deduced: —

$$q = t + 0.00002t^2 + 0.0000003t^3.$$

The specific heat at any temperature is, therefore, —

$$c = \frac{dq}{dt} = 1 + 0.00004t + 0.0000009t^2.$$

These equations are for use with the Centigrade scale; for the Fahrenheit scale, a given temperature may be reduced to the Centigrade scale, and then introduced in the same equations.

The process of making the experiments is really a complex one; for the water, in leaving the boiler, has work done on it by the steam pressure in the boiler, and it has a certain velocity impress on it at the same time, and again, in entering the calorimeter, it does work against the atmospheric pressure, and the kinetic energy of its motion is changed into heat. At higher temperatures there is a double change of state; part of the water changes to steam on leaving the boiler, and that steam is condensed again in the calorimeter. It is probable that the error of neglecting the effect of these several actions is inconsiderable.

The degree of accuracy to be accorded to this work is indicated by the fact that Regnault gives four significant figures in stating the data for the calculation of the constants in the equations.

Rowland's Experiments. — A series of experiments was made by Rowland at Baltimore, to determine the mechanical equivalent of heat, which gave a delicate method of determining the heat of the liquid, and the specific heat.

The apparatus used was similar to that used by Joule, with modifications to give greater certainty of results. The calorimeter was of larger size, and the paddle had the upper vanes curved like the blades of a centrifugal pump, to give a strong circulation up through the centre, past the thermometer for taking the temperatures, and down at the outside. The paddle was driven by a petroleum engine, and the power applied was measured by making the calorimeter into a friction brake, with two arms at which the turning moment was measured. Radiation was made as small as possible, and then was made determinate by use of a water-jacket outside of the calorimeter.

The experiments consisted essentially in delivering a measured amount of work to the water in the calorimeter, and in noting the rise of temperature produced thereby.

The whole range covered by the experiments was from 2° to 41° C. The results show that 430 kilogrammetres of work are required to raise one kilogramme of water from 2° to 3° C. Assuming that the same amount will be

Degrees, C.	Total Number of Kilogrammeters.	Mechanical Equivalent of Heat.	Heat of the Liquid, Experimental.	Heat of the Liquid, Calculated.	Degrees, C.	Total Number of Kilogrammeters.	Mechanical Equivalent of Heat.	Heat of the Liquid, Experimental.	Heat of the Liquid, Calculated.
1	430	–	1.0068	1.007	22	9424	426.1	22.065	22.063
2	860	–	2.0135	2.014	23	9850	426.0	23.063	23.061
3	1290	–	3.0204	3.022	24	10277	425.9	24.062	24.059
4	1721	–	4.0295	4.029	25	10701	425.8	25.055	25.058
5	2150	429.8	5.0339	5.036	26	11128	425.7	26.054	26.053
6	2580	429.5	6.0408	6.040	27	11553	425.6	27.050	27.048
7	3009	429.3	7.0452	7.045	28	11978	425.6	28.045	28.042
8	3439	429.0	8.0520	8.049	29	12399	425.5	29.031	29.037
9	3868	428.8	9.0564	9.054	30	12828	425.6	30.035	30.032
10	4296	428.5	10.059	10.058	31	13253	425.6	31.030	31.027
11	4723	428.3	11.058	11.060	32	13675	425.6	32.018	32.023
12	5151	428.1	12.061	12.061	33	14101	425.7	33.016	33.018
13	5578	427.9	13.060	13.063	34	14527	425.7	34.011	34.014
14	6006	427.7	14.063	14.064	35	14952	425.8	35.008	35.009
15	6433	427.4	15.065	15.066	36	15379	425.8	36.008	36.007
16	6861	427.2	16.064	16.066	37	15805	–	37.007	37.005
17	7289	427.0	17.066	17.066	38	16231	–	38.003	38.004
18	7717	426.8	18.068	18.066	39	16657	–	39.000	39.002
19	8144	426.6	19.068	19.066	40	17083	–	39.998	40.000
20	8571	426.4	20.068	20.066	41	17508	–	40.993	–
21	8997	426.2	21.065	21.064					

In the above table, column 1 gives the number of degrees above freezing on the Centigrade scale; column 2 gives the number of kilogrammetres required to raise one kilogramme of water from freezing point to the given temperature; column 3 is Rowland's mechanical equivalent of heat at the given temperature derived from 10° intervals on column 2; column 4 is obtained by dividing the numbers in column 2 by the mechanical equivalent of heat at 16⅔° C., or 62° F., from column 3; and column 5 is calculated by considering the specific heat to be constant for each five degrees of temperature. These specific heats were derived from a curve obtained by plotting temperatures for abscissæ, and heats of the liquid for ordinates. The values of the specific heats will be given later, in connection with those for higher temperatures.

A review of the preceding table shows that the specific heat at low temperatures varies quite markedly, so that it appeared advisable to investigate the effect of this variation on Regnault's experiments already quoted. This was done quite expeditiously by multiplying the mean specific heat given by him for his several experiments by the true average specific heat for the range of temperature in the calorimeter. This corrected specific heat was

temperature of the boiler. The results were then plotted as before, and compared with the heats of the liquid derived from Regnault's mean specific heats uncorrected. The points by the corrected method were a little more regularly arranged than the points obtained by assuming the specific heat to be unity at low temperatures; but the improvement was inconsiderable. The inequality of the specific heat at low temperatures is seldom so much as the unavoidable errors of the method.

It appeared, that if the specific heat was assumed to be constant, from 40° to 45°, from 45° to 155°, and from 155° to 200° C., the straight lines thus drawn represented the experimental values as recalculated quite nearly; and, further, they represented the uncorrected experimental values more nearly than Regnault's equation.

Specific Heat of Water. — The combination of Rowland's and Regnault's experiments on the heat of the liquid by the method described gives the specific heats set down in the following table, Centigrade scale: —

					SPECIFIC HEAT.
From	0° to	5° C.	32° to	41° F.	1.0072
	5°	10°	41°	50°	1.0044
	10°	15°	50°	59°	1.0016
	15°	20°	59°	68°	1.
	20°	25°	68°	77°	0.9984
	25°	30°	77°	86°	0.9948
	30°	35°	86°	95°	0.9954
	35°	40°	95°	104°	0.9982
	40°	45°	104°	113°	1.
	45°	155°	113°	311°	1.008
	155°	200°	311°	392°	1.046

Thermal Unit. — Heat is measured in calories, or British thermal units (*BTU*). A calorie commonly is defined as the heat required to raise one kilogramme of water from freezing point to 1° C.; and a British thermal unit, that required to raise one pound from 32° to 33° F. Nothing is known about the specific heat of water from 0° to 2° C.; consequently the commonly accepted value of the thermal unit is an ideal quantity inferred from the behavior of water at higher temperatures. It is more scientific to take an easily verified quantity for the standard; and there is a practical convenience in choosing 62° F. for the standard temperature, because it is near the mean temperature of the air during experimental work. Therefore, it is near the mean temperature in the calorimeter during ordinary work with that instru-

one pound of water from 62° to 63° F. This agrees substantially with the definition of the calorie, as the heat required to raise one kilogramme of water from 15° to 16° C.

In the tables for other vapors than steam, the old definition for the calorie, and Regnault's value for the heat of the liquid, are retained, to avoid entire recalculation.

Mechanical Equivalent of Heat. — The mechanical equivalent in metre-kilogrammes of one calorie at $16\frac{2}{3}$° C., deduced from Rowland's experiments in the third column of the table on page 58, is 427.1.

Since the value given by Joule is commonly quoted, it will be of interest to make a comparison of his latest work (1873) with Rowland's, as given in the following table: —

Temperature.	Joule's Value at Manchester, English System.	Reduced to the Air Thermometer and to the latitude of Baltimore.		Rowland's Value, corresponding.
		English.	French.	
14.7°	772.7	776.1	425.8	427.6
12.7°	774.6	778.5	427.1	428.0
15.5°	773.1	776.4	426.0	427.3
14.5°	767.0	770.5	422.7	427.5
17.3°	774.0	777.0	426.3	426.9

The value of g at Baltimore, latitude 39° 17′, is 980.05 centimetres therefore, reducing to 45° of latitude, and at the sea level, the value of the mechanical equivalent of heat is

$$J = 426.9.$$

To reduce to the English system, multiply by $\frac{9}{5}$, and by the length of the metre in feet, so that

$$J = 778.$$

Total Heat. — This term is defined as the heat required to raise a unit of weight of water from freezing point to a given temperature, and to entirely evaporate it at that temperature. The experiments made by Regnault were in the reverse order; that is, steam was led from a boiler into the calorimeter, and there condensed. Knowing the initial and final weights of the calorimeter, the temperature of the steam, and the initial and final temperatures of the water in the calorimeter, he was able, after applying the necessary corrections, to calculate the total heats for the several experiments.

As a conclusion of the work, he gives the following values for the total heats: —

10°	610	By equation, 609.6

Assuming an equation of the form

$$\lambda = A + Bt,$$

Regnault calculated the constants from the values given for 100° and 195°, and gives the equation

$$\lambda = 606.5 + 0.305t.$$

Wishing to see the effect of the varying value of the specific heat at low temperatures, I recalculated the total heats given by experiment, by a method resembling that used in recalculation of the heats of the liquid, and plotted the results together with Regnault's values uncorrected. The recalculated points were a little more regular than the original ones, and lay nearer the line represented by the above equation. Especially did the recalculated points for those experiments, for which the true mean specific heat of the water in the calorimeter was nearly unity, lie near that line. It therefore appears that the equation represents our best knowledge of the total heat of steam.

For the Fahrenheit scale the equation becomes

$$\lambda = 1091.7 + 0.305\,(t - 32).$$

Heat of Vaporization. — If the heat of the liquid be subtracted from the total heat, the remainder is called the heat of vaporization, and is represented by r, so that

$$r = \lambda - q.$$

Internal and External Latent Heat. — The heat of vaporization overcomes external pressure, and changes the state from liquid to vapor at constant temperature and pressure. Let the specific volume of the saturated vapor be s, and that of the liquid be σ, then the change of volume is $s - \sigma = u$, on passing from the liquid to the vaporous state. The external work is

$$p(s - \sigma) = pu,$$

and the corresponding amount of heat, or the external latent heat, is

$$Ap(s - \sigma) = Apu,$$

A being the reciprocal of the mechanical equivalent of heat.

The heat required to do the disgregation work, or the internal latent heat, is

$$\rho = r - Apu.$$

Specific Volume and Density of Steam. — On account of the great difficulty of direct determination of the weight of saturated steam, it is customary to calculate the specific volume of steam by aid of the following equation, derived by the application of the principles of thermo-dynamics to the general

in which A is the reciprocal of the mechanical equivalent of heat, T is the temperature from the absolute zero, and σ is the volume of one unit of weight of the liquid from which the vapor is formed. The differential co-efficient $\frac{dp}{dt}$ can be calculated by aid of the equations on page 11.

The absolute temperature is obtained by adding 273.7 to the temperature in degrees Centigrade, or 460.7 to the temperature in degrees Fahrenheit.

The volumes and densities of saturated steam given in Tables I, II, and III, were calculated by this method.

It is of interest to consider the degree of accuracy that may be expected from this method of calculating the density of saturated vapor. The value of r repends on λ and q; for the first, Regnault gives three figures in the data from which the empirical equation is deduced, and the experimental work does not indicate a greater degree of accuracy. The fourth figure, if stated, is likely to be in error to the extent of five units. The value of T is commonly stated in four figures, of which the last may be in error by two units. A, as determined by Rowland, has four figures, the last being uncertain to the extent of one or two units. The differential co-efficient $\frac{dp}{dt}$ is deduced from the equations for calculating p; and those equations are derived from data having five places of significant figures. Now the Equations B and C, for steam at 45° of latitude for the English system give a pressure of 14.6967 pounds on the square inch; but the specific volume calculated by aid of Equation B is 26.550 cubic feet, while Equation C gives 26.637 cubic feet. The mean, 26.60, differs from either extreme by about one in seven hundred. This discrepancy is due to the fact that the curves represented by Equations B and C meet at the common temperature, 212°, but do not have a common tangent. Since the equations are empirical and not logical, the error or uncertainty is unavoidable, and all calculated specific volumes are affected by a similar uncertainty. The greatest probable error is in determining r, for which it may be about one in one thousand. The error introduced into this equation by using the values of A in common use, that is, 772 instead of 778, is about one in one hundred.

Tate and Fairbairn's Experiments. — In 1860 an attempt was made by Tate and Fairbairn to determine the specific volume of steam by direct experiment. The following table, taken from the *Philosophical Transactions, Vol. cl.*, gives the results of all their experiments, together with the volumes calculated by their empirical formula,

	Pressure in Inches of Mercury. P.	Maximum Temperature, Fahrenheit, of Saturation. T	Specific Volume from Experiments. V.	Specific Volume from Formula. V.	Error of Formula.
1	5.35	136.77	8275.3	8183	$-\frac{1}{90}$
2	8.62	155.33	5333.5	5326	$-\frac{1}{762}$
3	9.45	159.36	4920.2	4900	$-\frac{1}{246}$
4	12.47	170.92	3722.6	3766	$+\frac{1}{87}$
5	12.61	171.48	3715.1	3740	$+\frac{1}{149}$
6	13.62	174.92	3438.1	3478	$+\frac{1}{86}$
7	16.01	182.30	3051.0	2985	$-\frac{1}{46}$
8	18.36	188.30	2623.4	2620	$+\frac{1}{874}$
9	22.88	198.78	2149.5	2124	$-\frac{1}{90}$
1′	53.61	242.90	943.1	937	$-\frac{1}{157}$
2′	55.52	244.82	908.0	906	$-\frac{1}{454}$
3′	55.89	245.22	892.5	900	$+\frac{1}{111}$
4′	66.84	255.50	759.4	758	$-\frac{1}{719}$
5′	76.20	263.14	649.2	669	$+\frac{1}{32}$
6′	81.53	267.21	635.3	628	$-\frac{1}{91}$
7′	84.20	269.20	605.7	608	$+\frac{1}{354}$
8′	92.23	274.76	584.4	562	$-\frac{1}{26}$
9′	96.08	273.30	543.2	545	$+\frac{1}{271}$
10′	99.60	279.42	515.0	519	$+\frac{1}{128}$
11′	104.54	282.58	497.2	496	$-\frac{1}{407}$
12′	112.78	287.25	458.3	461	$+\frac{1}{152}$
13′	122.25	292.53	433.1	428	$-\frac{1}{85}$
14′	114.25	288.25	449.6	456	$+\frac{1}{75}$

It is apparent that the errors of this formula are much larger than the probable errors of the thermo-dynamic method.

The following table, giving the volumes in cubic metres of one kilogramme of saturated steam, shows the comparison of the two methods:—

	0° C.	50° C.	100° C.	150° C.	200° C.
By equation $s = \frac{r}{AT} \cdot \frac{dt}{dp} + \sigma$ . .	211.5	12.11	1.660	0.3875	0.1277
From equation $V = 25.62 + \frac{49153}{P + 0.72}$,	54.97	11.43	1.643	0.3706	0.1343

Steam Entropy. — From the second law of thermo-dynamics may be deduced the equation

$$d\phi = \frac{dQ}{T},$$

in which ϕ is the entropy, dQ is the heat applied or withdrawn, and T is the absolute temperature. Since the entropy depends on the state of the substance only, and not on the method of arriving at that state, we may calculate the increase of entropy in one unit of weight of a given mixture of water and steam, above the entropy at one pound of water at freezing-point, by the

freezing point to the temperature t, and that the portion x is then changed into steam. During the first operation the change of entropy will be

$$\theta = \int_0^t \frac{dq}{T} = \int_0^t \frac{cdt}{T}.$$

During the second operation the change of entropy will be

$$\frac{xr}{T},$$

since the heat is added at the constant temperature t. The entire change of entropy will be

$$\phi = \frac{xr}{T} + \int_0^t \frac{cdt}{T} = \frac{xr}{T} + \theta.$$

At any other state the entropy of a unit of weight of a mixture of steam and water will be

$$\phi_1 = \frac{x_1 r_1}{T_1} + \theta_1,$$

and the change of entropy will be

$$\phi - \phi_1 = \frac{xr}{T} + \theta - \frac{x_1 r_1}{T_1} - \theta_1.$$

During an adiabatic change no heat is transmitted, and the entropy is constant.

$$\frac{xr}{T} + \theta = \frac{x_1 r_1}{T_1} + \theta_1.$$

When the initial state including the value of x is known, and also the final temperature or pressure, the final value of x_1 may be calculated by the above equation; and the initial and final volumes may be found by the equations

$$v = xu + \sigma, \qquad v_1 = x_1 u_1 + \sigma;$$

the value of u for a given temperature or pressure, from the equation,

$$s = u + \sigma.$$

Entropy of the Liquid.—When the specific heat of a liquid is known in terms of the temperature, the entropy of the liquid,

$$\theta = \int_0^t \frac{cdt}{T},$$

is readily calculated. For water we have, for example, the entropy of the liquid at 13° C.

$$1.0072 \log_e \frac{T_5}{T_0} + 1.0044 \log_e \frac{T_{10}}{T_5} + 1.0016 \log_e \frac{T_{13}}{T_{10}}.$$

For other liquids having the general formula for the heat of the liquid,

$$q = at + bt^2 + ct^3,$$

Other Vapors. — Tables IV to IX are taken from Zeuner's *Mechanischen Wärmetheorie.* His values for the specific volume and density were calculated with 273 for the absolute temperature of 0° C., and with 424 for the mechanical equivalent of heat. To bring these tables into accord with Tables I, II, and III, the values of the specific volume and density have been modified by using 273.7 for the absolute temperature of 0° C., and 426.7 for the mechanical equivalent of heat at Paris.

The equations by which the tables were calculated, taken from Regnault's memoirs, *Académie des Sciences, Comptes rendus, Tome XXXVI,* are here assembled, together with Zeuner's equations for the differential co-efficient, $\frac{1}{p}\frac{dp}{dt}$.

TEMPERATURE AND PRESSURE.

1	log p 2	a 3	b 4	c 5
Alcohol	$a - b\alpha^n + c\beta^n$	5.4562028	4.9809960	0.0485397
Ether	$a + b\alpha^n - c\beta^n$	5.0286298	0.0002284	3.1906390
Chloroform	$a - b\alpha^n - c\beta^n$	5.2253893	2.9531281	0.0668673
Carbon bisulphide .	$a - b\alpha^n - c\beta^n$	5.4011662	3.4405663	0.2857386
Carbon tetrachloride .	$a - b\alpha^n - c\beta^n$	12.0962331	9.1375180	1.9674890

TEMPERATURE AND PRESSURE — *Concluded.*

	log α. 6	log β. 7	n 8	Limits. 9
Alcohol	$\bar{1}.99708557$	1.0409485	t + 20	−20°, + 150° C.
Ether	0.0145775	1.996877	t + 20	−20°, + 120°
Chloroform	$\bar{1}.9974144$	1.9868176	t − 20	+ 20°, + 164°
Carbon bisulphide .	$\bar{1}.9977628$	1.9911997	t + 20	−20°, + 140°
Carbon tetrachloride .	$\bar{1}.9997120$	$\bar{1}.9949780$	t + 20	−20°, + 188°

The equation for the temperature and pressure of the saturated vapor of aceton, as recalculated by Zeuner, is, —

$$\log p = a - b\alpha^n + c\beta^n.$$

$$a = 5.3085419$$

$$\frac{1}{p}\frac{dp}{dt} = A\alpha^n + B\beta^n$$

From Zeuner's *Wärmetheorie.*

	Sign.		Log ($A\alpha^n$)	Log ($B\beta^n$)
	$A\alpha^n$	$B\beta^n$		
Alcohol	+	−	$-1.1720041-0.0020143t$	$-2.9992701-0.0590515t$
Ether	+	+	$-1.3396624-0.0031223t$	$-4.4616396+0.0145775t$
Chloroform . . .	+	+	$-1.3410130-0.0025856t$	$-2.0667124-0.0131824t$
Carbon bisulphide .	+	+	$-1.4339778-0.0022372t$	$-2.0511078-0.0088003t$
Carbon tetrachloride,	+	+	$-1.8611078-0.0002880t$	$-1.3812195-0.0050220t$
Aceton	+	+	$-1.3268535-0.0026148t$	$-1.9064582-0.0215592t$
			t, temperature C.	

HEAT OF THE LIQUID.

Alcohol . . . $q = 0.54754t + 0.0011218t^2 + 0.000002206t^3$
Ether . . . $q = 0.52901t + 0.0002959t^2$
Chloroform . . $q = 0.23235t + 0.0000507t^2$
Carbon bisulphide . $q = 0.23523t + 0.0000815t^2$
Carbon tetrachloride . $q = 0.19798t + 0.0000906t^2$
Aceton . . . $q = 0.50643t + 0.0003965t^2$

TOTAL HEAT.

Ether . . . $\lambda = 94 + 0.45t - 0.0005556t^2$
Chloroform . . $\lambda = 67 + 0.1375t$
Carbon bisulphide . $\lambda = 90 + 0.14601t - 0.0004123t^2$
Carbon tetrachloride . $\lambda = 52 + 0.14625t - 0.000172t^2$
Aceton . . . $\lambda = 140.5 + 0.36644t - 0.000516t^2$

The total heat of alcohol varies in so irregular a manner that no equation can be given for it.

Zeuner gives the following empirical equations for calculating the heat equivalent of the internal work, which are proposed to lessen the labor of calculation

HEAT EQUIVALENT OF INTERNAL WORK.

Water . . . $\rho = 575.40 - 0.791t$
Ether . . . $\rho = 86.54 - 0.10648t - 0.0007160t^2$
Chloroform . . $\rho = 62.44 - 0.11282t - 0.0000140t^2$
Carbon bisulphide . $\rho = 82.79 - 0.11446t - 0.0004020t^2$
Carbon tetrachloride . $\rho = 48.57 - 0.06844t - 0.0002080t^2$
Aceton . . . $\rho = 131.63 - 0.20184t - 0.0006280t^2$

Sulphur Dioxide and Ammonia.—The use of ice-machines has brought into prominence liquids which vaporize at low temperatures. For two such

SULPHUR DIOXIDE.

$$\log p = a - b\alpha^n - c\beta^n$$
$$a = 5.6663790$$
$$b = 3.0146890$$
$$c = 0.1465400$$
$$\log \alpha = \bar{1}.9972989$$
$$\log \beta = \bar{1}.9872900$$
$$n = t + 28$$

Limits, -28, $+62$.

AMMONIA.

$$\log p = a - b\alpha^n - c\beta^n$$
$$a = 11.5043330$$
$$b = 7.4503520$$
$$c = 0.9499674$$
$$\log \alpha = \bar{1}.9996014$$
$$\log \beta = \bar{1}.9939729$$
$$n = t + 22$$

Limits, -22, $+82$.

Unfortunately the heat of the liquid and the total heat for these substances have not been determined. We have, however, some of the properties of these substances in the gaseous state or more properly in the state of superheated vapors.

Now, it has been shown by Zeuner that superheated steam may have its properties represented by the equation

$$pv = BT - Cp^a,$$

in which p is the pressure in pounds on the square foot or kilograms on the square meter, v is the volume of a pound in cubic feet or of a kilogram in cubic meters, and T is the absolute temperature. The constants have the following values when calculated from the properties of saturated steam:

French units, ...	$B = 51.3$	$C = 198$	$a = \frac{1}{4}$.
English units, ...	$B = 93.5$	$C = 971$	$a = \frac{1}{4}$.

It was first proposed by Ledoux to find similar equations to represent the properties of superheated sulphur dioxide and ammonia, and to use such equations for calculating approximate tables of the properties of these vapors when saturated, just as the tables of the properties of saturated steam had been used in establishing the equation for superheated steam.

In the *Thermodynamics of the Steam-engine* by the author, pages 452 to 459, this calculation has been carried out with the best ascertained properties of the superheated vapors of sulphor dioxide and ammonia with the following results:

	SULPHUR DIOXIDE.	AMMONIA.
French units,	$pv = 14.5\ T - 48p^{0.22}$	$pv = 54.3\ T - 142p^{\frac{1}{4}}$
English units,	$pv = 26.4\ T - 184p^{0.22}$	$pv = 99\ T - 540p^{\frac{1}{4}}$

The application of these equations to the vapors when saturated gives

Heat of Vaporization.

	SULPHUR DIOXIDE.	AMMONIA.
French units,	$r = 98 - 0.27t$	$r = 300 - 0.8t$.
English units,	$r = 176 - 0.27(t - 32)$	$r = 540 - 0.8(t - 32)$.

Specific Heat of the Liquid.

SULPHUR DIOXIDE.	AMMONIA.
$c = 0.4$	$c = 1.1$

Tables X and XI were calculated by aid of the equations written, and may be of use for approximate calculations, in default of more reliable tables.

Specific Volume of Liquids. — Table XII was taken from the *Phys.-Chem. Tabellen* of Landolt and Börnstein.

Volume of Water. — Table XIII gives the volumes of water compared with its volume at 4°. From 0° to 100° C., the values are those given by Rossetti. Above 100°, the values are those calculated by the equations given by Hirn in the *Annales de Chimie et de Physique, 1867.*

Volumes of Liquids. — The volumes of liquids at high temperatures, compared with the volume at freezing point, are represented by the following equations given by Hirn in the *Annales :* —

		Logs.
Water 100° C. to 200° C. (vol. at 4° C. = unity)	$v = 1 + 0.00010867875t$	6.0361445 − 10
	$+ 0.0000030073653t^2$	4.4781862 − 10
	$+ 0.0000000028730422t^3$	1.4583419 − 10
	$- 0.0000000000066457031t^4$	8.8225409 − 20
Alcohol 30° C. to 160° C. (vol. at 0° C. = unity)	$v = 1 + 0.00073892265t$	6.8685991 − 10
	$+ 0.0000010552351t^2$	3.0233492 − 10
	$- 0.000000092480842t^3$	2.9660517 − 10
	$+ 0.00000000040413567t^4$	0.6065278 − 10
Ether 30° C. to 130° C. (vol. at 0° C. = unity)	$v = 1 + 0.0013489059t$	7.1299817 − 10
	$+ 0.0000065537t^2$	4.8164866 − 10
	$- 0.000000034490756t^3$	2.5377028 − 10
	$+ 0.00000000033772062t^4$	0.5285571 − 10
Carbon bisulphide 30° to 160° C. (vol. at 0° C. = unity)	$v = 1 + 0.0011680559t$	7.0674636 − 10
	$+ 0.0000016489598t^2$	4.2172103 − 10
	$- 0.00000000081119062t^3$	0.9091229 − 10
	$+ 0.000000000060946589t^4$	.7849494 − 20
Carbon tetrachloride 30° to 160° C. (vol. at 0° C. = unity)	$v = 1 + 0.0010671883t$	7.0282409 − 10
	$+ 0.0000035651378t^2$	4.5520763 − 10
	$- 0.000000014949281t^3$	2.1746202 − 10
	$+ 0.0000000000085182318t^4$	9.9303494 − 20

Other Data. — For convenience the following data are assembled: —

Length of the metre in inches	39.3702 (Rogers) 39.370432 (Clarke)
Weight of the kilogramme in pounds . . .	2.20462125
Weight of 1 litre (1 cu. decimetre) of mercury .	13.5959 kilos.
One horse power, in foot pounds per second .	550
Cheval à vapeur, in kilogrammetres per second .	75
Normal pressure of the atmosphere . . .	760 mm. of mercury. 10,333 kilos per sq. m. 14.6967 lbs. per sq. in. 2116.32 lbs. per. sq. ft.
Absolute temperature of freezing point . .	273.°7 C. 492.°7 F.

Explanation of the Tables. — In Table I, the first column gives the temperature, t, of saturated steam.

The second column gives the corresponding pressure, p, in pounds on the square inch, above an absolute vacuum; the differences are placed between the two numbers from which they are derived. For example, the pressure at 40° F. is 0.1216 pounds per square inch; and the difference to be used in interpolation, and placed half a line lower, is 48.

The third column gives the heat of the liquid, q, required to raise the temperature of one pound of water from 32° F. to a given temperature.

The fourth column gives the total heat, λ, required to raise one pound of water from 32° F. to a given temperature, and to entirely vaporize it under the pressure due to that temperature.

The fifth column gives the heat of vaporization, or the heat required to vaporize one pound of water at a given temperature, under the pressure corresponding.

The sixth column gives the heat required to do the disgregation work during the vaporization of one pound of water.

The seventh column gives the heat required to overcome the external pressure, and do the work of increasing the volume from σ to s.

The eighth column gives the entropy of the liquid.

The ninth and tenth columns give the specific volume, or volume in cubic feet, of one pound of saturated steam, and the density or weight of one cubic foot in pounds.

Table II differs from Table I in that it is arranged to give the properties of saturated steam for each pound of pressure.

Table III gives the properties of saturated steam in French units; and Tables IV to XI give the properties of other saturated vapors in the same

TABLE I.

SATURATED STEAM.

ENGLISH UNITS.

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Diff.	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Diff.	DENSITY. Weight, in Pounds, of one Cubic Foot. γ	Diff.	Temperature, Degrees Fahr. t
32	0.0890	36	0	1091.7	1091.7	1035.9	55.8	0.0000	3387	127	0.0002952	115	**32**
33	0.0926	37	1.01	1092.0	1091.0	1035.1	55.9	0.0020	3260	122	0.0003067	120	**33**
34	0.0963	39	2.01	1092.3	1090.3	1034.3	56.0	0.0041	3138	116	0.0003187	122	**34**
35	0.1002	40	3.02	1092.6	1089.6	1033.6	56.0	0.0061	3022	112	0.0003309	127	**35**
36	0.1042	41	4.03	1092.9	1088.9	1032.8	56.1	0.0081	2910	107	0.0003436	132	**36**
37	0.1083	43	5.04	1093.2	1088.2	1032.0	56.2	0.0101	2803	103	0.0003568	136	**37**
38	0.1126	44	6.04	1093.5	1087.5	1031.3	56.2	0.0122	2700	99	0.0003704	141	**38**
39	0.1170	46	7.05	1093.8	1086.7	1030.4	56.3	0.0142	2601	95	0.0003845	145	**39**
40	0.1216	48	8.06	1094.1	1086.0	1029.6	56.4	0.0162	2506	91	0.0003990	151	**40**
41	0.1264	49	9.06	1094.4	1085.3	1028.8	56.5	0.0182	2415	87	0.0004141	155	**41**
42	0.1313	51	10.07	1094.8	1084.7	1028.1	56.6	0.0202	2328	84	0.0004296	160	**42**
43	0.1364	53	11.07	1095.1	1084.0	1027.3	56.7	0.0222	2244	80	0.0004456	165	**43**
44	0.1417	54	12.08	1095.4	1083.3	1026.5	56.8	0.0242	2164	77	0.0004621	171	**44**
45	0.1471	57	13.08	1095.7	1082.6	1025.8	56.8	0.0262	2087	74	0.0004792	176	**45**
46	0.1528	58	14.09	1096.0	1081.9	1025.0	56.9	0.0282	2013	71	0.0004968	181	**46**
47	0.1586	60	15.09	1096.3	1081.2	1024.2	57.0	0.0302	1942	68	0.0005149	187	**47**
48	0.1646	62	16.10	1096.6	1080.5	1023.4	57.1	0.0322	1874	66	0.0005336	194	**48**
49	0.1708	65	17.10	1096.9	1079.8	1022.6	57.2	0.0341	1808	63	0.0005530	201	**49**
50	0.1773	66	18.10	1097.2	1079.1	1021.8	57.3	0.0361	1745	60	0.0005731	206	**50**
51	0.1839	69	19.11	1097.5	1078.4	1021.1	57.3	0.0381	1685	59	0.0005937	213	**51**
52	0.1908	71	20.11	1097.8	1077.7	1020.3	57.4	0.0400	1626	56	0.0006150	219	**52**
53	0.1979	73	21.11	1098.1	1077.0	1019.5	57.5	0.0420	1570	54	0.0006369	226	**53**
54	0.2052	76	22.11	1098.4	1076.3	1018.7	57.6	0.0439	1516	51	0.0006595	234	**54**
55	0.2128	78	23.11	1098.7	1075.6	1017.9	57.7	0.0459	1465	50	0.0006829	240	**55**
56	0.2206	81	24.11	1099.0	1074.9	1017.1	57.8	0.0478	1415	48	0.0007069	248	**56**
57	0.2287	83	25.12	1099.3	1074.2	1016.3	57.9	0.0497	1367	46	0.0007317	254	**57**
58	0.2370	86	26.12	1099.6	1073.5	1015.6	57.9	0.0517	1321	45	0.0007571	263	**58**
59	0.2456	89	27.12	1099.9	1072.8	1014.8	58.0	0.0536	1276	42	0.0007834	270	**59**
60	0.2545	92	28.12	1100.2	1072.1	1014.0	58.1	0.0555	1234	41	0.0008104	280	**60**
61	0.2637		29.12	1100.5	1071.4	1013.2	58.2	0.0574	1193		0.0008384		**61**

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{c\,dt}{T}$	Specific Volume. s	Density. Weight in Pounds of one Cubic Foot. γ	Temperature, Degrees Fahr. t
64	0.2929$_{104}$	32.12	1101.5	1069.4	1010.9	58.5	0.0632	1078$_{36}$	0.0009273$_{313}$	64
65	0.3033$_{107}$	33.12	1101.8	1068.7	1010.1	58.6	0.0651	1042$_{33}$	0.0009586$_{325}$	65
66	0.3140$_{110}$	34.12	1102.1	1068.0	1009.4	58.6	0.0670	1009$_{327}$	0.0009911$_{329}$	66
67	0.3250$_{114}$	35.12	1102.4	1067.3	1008.6	58.7	0.0689	976.3$_{316}$	0.001024$_{35}$	67
68	0.3364$_{117}$	36.12	1102.7	1066.6	1007.8	58.8	0.0708	944.7$_{304}$	0.001059$_{35}$	68
69	0.3481$_{121}$	37.12	1103.0	1065.9	1007.0	58.9	0.0727	914.3$_{293}$	0.001094$_{36}$	69
70	0.3602$_{124}$	38.11	1103.3	1065.2	1006.2	59.0	0.0745	885.0$_{283}$	0.001130$_{37}$	70
71	0.3726$_{128}$	39.11	1103.6	1064.5	1005.4	59.1	0.0764	856.7$_{272}$	0.001167$_{38}$	71
72	0.3854$_{132}$	40.11	1103.9	1063.8	1004.6	59.2	0.0783	829.5$_{263}$	0.001205$_{40}$	72
73	0.3986$_{136}$	41.11	1104.2	1063.1	1003.8	59.3	0.0802	803.2$_{253}$	0.001245$_{41}$	73
74	0.4122$_{140}$	42.11	1104.5	1062.4	1003.0	59.4	0.0820	777.9$_{244}$	0.001286$_{41}$	74
75	0.4262$_{144}$	43.11	1104.8	1061.7	1002.3	59.4	0.0839	753.5$_{236}$	0.001327$_{43}$	75
76	0.4406$_{149}$	44.11	1105.1	1061.0	1001.5	59.5	0.0858	729.9$_{228}$	0.001370$_{44}$	76
77	0.4555$_{153}$	45.10	1105.4	1060.3	1000.7	59.6	0.0876	707.1$_{219}$	0.001414$_{45}$	77
78	0.4708$_{157}$	46.10	1105.7	1059.6	999.9	59.7	0.0895	685.2$_{211}$	0.001459$_{46}$	78
79	0.4865$_{162}$	47.09	1106.0	1058.9	999.1	59.8	0.0913	664.1$_{203}$	0.001505$_{48}$	79
80	0.5027$_{167}$	48.09	1106.3	1058.2	998.3	59.9	0.0932	643.8$_{197}$	0.001553$_{49}$	80
81	0.5194$_{171}$	49.08	1106.6	1057.5	997.5	60.0	0.0950	624.1$_{191}$	0.001602$_{51}$	81
82	0.5365$_{177}$	50.08	1107.0	1056.9	996.8	60.1	0.0968	605.0$_{184}$	0.001653$_{52}$	82
83	0.5542$_{181}$	51.07	1107.3	1056.2	996.0	60.2	0.0987	586.6$_{178}$	0.001705$_{53}$	83
84	0.5723$_{187}$	52.07	1107.6	1055.5	995.2	60.3	0.1005	568.8$_{171}$	0.001758$_{55}$	84
85	0.5910$_{192}$	53.06	1107.9	1054.8	994.4	60.4	0.1023	551.7$_{165}$	0.001813$_{56}$	85
86	0.6102$_{197}$	54.06	1108.2	1054.1	993.7	60.4	0.1041	535.2$_{160}$	0.001869$_{57}$	86
87	0.6299$_{203}$	55.05	1108.5	1053.4	992.9	60.5	0.1060	519.2$_{155}$	0.001926$_{59}$	87
88	0.6502$_{209}$	56.05	1108.8	1052.7	992.1	60.6	0.1078	503.7$_{148}$	0.001985$_{60}$	88
89	0.6711$_{214}$	57.04	1109.1	1052.1	991.4	60.7	0.1096	488.9$_{143}$	0.002045$_{62}$	89
90	0.6925$_{221}$	58.04	1109.4	1051.4	990.6	60.8	0.1114	474.6$_{139}$	0.002107$_{64}$	90
91	0.7146$_{226}$	59.03	1109.7	1050.7	989.8	60.9	0.1132	460.7$_{136}$	0.002171$_{66}$	91
92	0.7372$_{233}$	60.03	1110.0	1050.0	989.0	61.0	0.1150	447.1$_{131}$	0.002237$_{67}$	92
93	0.7605$_{239}$	61.03	1110.3	1049.3	988.2	61.1	0.1168	434.0$_{125}$	0.002304$_{68}$	93
94	0.7844$_{246}$	62.02	1110.6	1048.6	987.4	61.2	0.1186	421.5$_{122}$	0.002372$_{71}$	94
95	0.8090$_{252}$	63.02	1110.9	1047.9	986.6	61.3	0.1204	409.3$_{118}$	0.002443$_{73}$	95
96	0.8342$_{259}$	64.01	1111.2	1047.2	985.8	61.4	0.1222	397.5$_{114}$	0.002516$_{74}$	96
97	0.8601$_{266}$	65.01	1111.5	1046.5	985.0	61.5	0.1240	386.1$_{110}$	0.002590$_{76}$	97
98	0.8867$_{273}$	66.01	1111.8	1045.8	984.2	61.6	0.1258	375.1$_{107}$	0.002666$_{78}$	98
99	0.9140$_{281}$	67.01	1112.1	1045.1	983.4	61.7	0.1275	364.4$_{104}$	0.002744$_{80}$	99
100	0.9421$_{[illegible]}$	68.01	1112.4	1044.4	982.7	61.7	0.1293	354.0$_{[illegible]}$	0.002824$_{82}$	100

Temperature, Degrees Fahr.	Pressure, Pounds per Square Inch.	Heat of the Liquid.	Total Heat.	Heat of Vaporization.	Heat equivalent of Internal Work.	Heat equivalent of External Work.	Entropy of the Liquid.	Specific Volume.	DENSITY. Weight, in Pounds, of one Cubic Foot.	Temperature, Degrees Fahr.
t	p	q	λ	r	ρ	Apu	$\int \frac{c\,dt}{T}$	s	γ	t
104	1.0619_{319}	72.0	1113.7	1041.7	979.6	62.1	0.1364	316.1_{88}	0.003163_{91}	**104**
105	1.0938_{328}	73.0	1114.0	1041.0	978.8	62.2	0.1382	307.3_{85}	0.003254_{93}	**105**
106	1.1266_{336}	74.0	1114.3	1040.3	978.0	62.3	0.1400	298.8_{82}	0.003347_{94}	**106**
107	1.1602_{345}	75.0	1114.6	1039.6	977.2	62.4	0.1417	290.6_{79}	0.003441_{96}	**107**
108	1.1947_{354}	76.0	1114.9	1038.9	976.4	62.5	0.1435	282.7_{77}	0.003537_{99}	**108**
109	1.2301_{362}	77.0	1115.2	1038.2	975.6	62.6	0.1452	275.0_{75}	0.003636_{102}	**109**
110	1.2663_{372}	78.0	1115.5	1037.5	974.8	62.7	0.1470	267.5_{72}	0.003738_{104}	**110**
111	1.3035_{381}	79.0	1115.8	1036.8	974.0	62.8	0.1487	260.3_{70}	0.003842_{106}	**111**
112	1.3416_{391}	80.0	1116.1	1036.1	973.2	62.9	0.1505	253.3_{68}	0.003948_{109}	**112**
113	1.3807_{400}	81.0	1116.4	1035.4	972.4	63.0	0.1522	246.5_{66}	0.004057_{111}	**113**
114	1.4207_{411}	82.0	1116.7	1034.7	971.6	63.1	0.1540	239.9_{64}	0.004168_{115}	**114**
115	1.4618_{421}	83.0	1117.0	1034.0	970.8	63.2	0.1558	233.5_{62}	0.004283_{116}	**115**
116	1.5039_{431}	84.0	1117.3	1033.3	970.0	63.3	0.1575	227.3_{60}	0.004399_{120}	**116**
117	1.5470_{442}	85.0	1117.6	1032.6	969.2	63.4	0.1592	221.3_{58}	0.004519_{121}	**117**
118	1.5912_{452}	86.0	1117.9	1031.9	968.4	63.5	0.1610	215.5_{56}	0.004640_{124}	**118**
119	1.6364_{464}	87.0	1118.2	1031.2	967.6	63.6	0.1627	209.9_{55}	0.004764_{128}	**119**
120	1.6828_{474}	88.1	1118.5	1030.4	966.7	63.7	0.1645	204.4_{53}	0.004892_{130}	**120**
121	1.7302_{487}	89.1	1118.8	1029.7	966.0	63.7	0.1662	199.1_{52}	0.005022_{134}	**121**
122	1.7789_{498}	90.1	1119.2	1029.1	965.3	63.8	0.1679	193.9_{50}	0.005156_{137}	**122**
123	1.8287_{510}	91.1	1119.5	1028.4	964.5	63.9	0.1697	188.9_{48}	0.005293_{139}	**123**
124	1.8797_{521}	92.1	1119.8	1027.7	963.7	64.0	0.1714	184.1_{47}	0.005432_{142}	**124**
125	1.9318_{534}	93.1	1120.1	1027.0	962.9	64.1	0.1731	179.4_{46}	0.005574_{146}	**125**
126	1.9852_{547}	94.1	1120.4	1026.3	962.1	64.2	0.1748	174.8_{44}	0.005720_{148}	**126**
127	2.0399_{560}	95.1	1120.7	1025.6	961.3	64.3	0.1765	170.4_{43}	0.005868_{152}	**127**
128	2.0959_{574}	96.1	1121.0	1024.9	960.5	64.4	0.1783	166.1_{42}	0.006020_{156}	**128**
129	2.1533_{586}	97.1	1121.3	1024.2	959.7	64.5	0.1800	161.9_{41}	0.006176_{160}	**129**
130	2.2119_{600}	98.1	1121.6	1023.5	958.9	64.6	0.1817	157.8_{39}	0.006336_{162}	**130**
131	2.2719_{614}	99.1	1121.9	1022.8	958.1	64.7	0.1834	153.9_{38}	0.006498_{166}	**131**
132	2.3333_{628}	100.2	1122.2	1022.0	957.2	64.8	0.1851	150.1_{37}	0.006664_{169}	**132**
133	2.3961_{642}	101.2	1122.5	1021.3	956.4	64.9	0.1868	146.4_{36}	0.006833_{172}	**133**
134	2.4603_{658}	102.2	1122.8	1020.6	955.6	65.0	0.1885	142.8_{36}	0.007005_{176}	**134**
135	2.5261_{671}	103.2	1123.1	1019.9	954.8	65.1	0.1902	139.2_{34}	0.007181_{180}	**135**
136	2.5932_{687}	104.2	1123.4	1019.2	954.0	65.2	0.1919	135.8_{33}	0.007361_{184}	**136**
137	2.6619_{702}	105.2	1123.7	1018.5	953.2	65.3	0.1936	132.5_{32}	0.007545_{187}	**137**
138	2.7321_{719}	106.2	1124.0	1017.8	952.4	65.4	0.1952	129.3_{31}	0.007732_{192}	**138**
139	2.8040_{734}	107.2	1124.3	1017.1	951.6	65.5	0.1969	126.2_{30}	0.007924_{196}	**139**
140	2.8774_{751}	108.2	1124.6	1016.4	950.8	65.6	0.1986	123.2_{30}	0.008120_{198}	**140**
141	2.9525_{767}	109.2	1124.9	1015.7	950.0	65.7	0.2003	120.2_{29}	0.008318_{204}	**141**

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p		Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{dq}{T}$	Specific Volume. s		Density. Weight, in Pounds, of one Cubic Foot. γ		Temperature, Degrees Fahr. t
144	3.1877	819	112.2	1125.9	1013.7	947.7	66.0	0.2053	111.8	26	0.008942	217	**144**
145	3.2696	836	113.3	1126.2	1012.9	946.8	66.1	0.2070	109.2	26	0.009159	220	**145**
146	3.3532	855	114.3	1126.5	1012.2	946.0	66.2	0.2086	106.6	25	0.009379	225	**146**
147	3.4387	873	115.3	1126.8	1011.5	945.2	66.3	0.2103	104.1	24	0.009604	229	**147**
148	3.5260	892	116.3	1127.1	1010.8	944.4	66.4	0.2119	101.7	24	0.009833	237	**148**
149	3.6152	911	117.3	1127.4	1010.1	943.6	66.5	0.2136	99.33	230	0.01007	24	**149**
150	3.7063	930	118.3	1127.7	1009.4	942.8	66.6	0.2152	97.03	224	0.01031	24	**150**
151	3.7993	950	119.3	1128.0	1008.7	942.0	66.7	0.2169	94.79	218	0.01055	25	**151**
152	3.8943	970	120.3	1128.3	1008.0	941.3	66.7	0.2185	92.61	212	0.01080	25	**152**
153	3.9913	990	121.3	1128.6	1007.3	940.5	66.8	0.2202	90.49	206	0.01105	26	**153**
154	4.0903	1011	122.3	1128.9	1006.6	939.7	66.9	0.2218	88.43	201	0.01131	26	**154**
155	4.1914	1032	123.3	1129.2	1005.9	938.9	67.0	0.2235	86.42	195	0.01157	27	**155**
156	4.2946	1054	124.3	1129.5	1005.2	938.1	67.1	0.2251	84.47	191	0.01184	27	**156**
157	4.4000	1075	125.4	1129.8	1004.4	937.2	67.2	0.2267	82.56	186	0.01211	28	**157**
158	4.5075	1097	126.4	1130.1	1003.7	936.4	67.3	0.2284	80.70	180	0.01239	28	**158**
159	4.6172	1120	127.4	1130.4	1003.0	935.6	67.4	0.2300	78.90	176	0.01267	29	**159**
160	4.7292	1143	128.4	1130.7	1002.3	934.8	67.5	0.2316	77.14	171	0.01296	30	**160**
161	4.8435	1166	129.4	1131.0	1001.6	934.0	67.6	0.2332	75.43	166	0.01326	30	**161**
162	4.9601	1189	130.4	1131.4	1001.0	933.3	67.7	0.2349	73.77	163	0.01356	30	**162**
163	5.079	121	131.4	1131.7	1000.3	932.5	67.8	0.2365	72.14	158	0.01386	31	**163**
164	5.200	124	132.4	1132.0	999.6	931.7	67.9	0.2381	70.56	155	0.01417	32	**164**
165	5.324	126	133.4	1132.3	998.9	930.9	68.0	0.2397	69.01	150	0.01449	32	**165**
166	5.450	129	134.4	1132.6	998.2	930.1	68.1	0.2413	67.51	146	0.01481	33	**166**
167	5.579	131	135.4	1132.9	997.5	929.3	68.2	0.2429	66.05	143	0.01514	34	**167**
168	5.710	134	136.4	1133.2	996.8	928.5	68.3	0.2445	64.62	140	0.01548	34	**168**
169	5.844	137	137.4	1133.5	996.1	927.7	68.4	0.2461	63.22	137	0.01582	35	**169**
170	5.981	139	138.5	1133.8	995.3	926.8	68.5	0.2477	61.85	132	0.01617	35	**170**
171	6.120	142	139.5	1134.1	994.6	926.0	68.6	0.2493	60.53	128	0.01652	36	**171**
172	6.262	145	140.5	1134.4	993.9	925.2	68.7	0.2509	59.25	126	0.01688	36	**172**
173	6.407	147	141.5	1134.7	993.2	924.4	68.8	0.2525	57.99	123	0.01724	38	**173**
174	6.554	150	142.5	1135.0	992.5	923.7	68.8	0.2541	56.76	120	0.01762	38	**174**
175	6.704	154	143.5	1135.3	991.8	922.9	68.9	0.2557	55.56	116	0.01800	38	**175**
176	6.858	156	144.5	1135.6	991.1	922.1	69.0	0.2573	54.40	114	0.01838	40	**176**
177	7.014	159	145.5	1135.9	990.4	921.3	69.1	0.2589	53.26	112	0.01878	40	**177**
178	7.173	162	146.5	1136.2	989.7	920.5	69.2	0.2604	52.14	108	0.01918	40	**178**
179	7.335	165	147.5	1136.5	989.0	919.7	69.3	0.2620	51.06	105	0.01958	42	**179**
180	7.500	168	148.5	1136.8	988.3	918.9	69.4	0.2636	50.01	103	0.02000	42	**180**

Temperature, Degrees Fahr.	Pressure, Pounds per Square Inch.	Heat of the Liquid.	Total Heat.	Heat of Vaporization.	Heat equivalent of Internal Work.	Heat equivalent of External Work.	Entropy of the Liquid.	Specific Volume.	Density. Weight, in Pounds, of one Cubic Foot.	Temperature, Degrees Fahr.
t	p	q	λ	r	ρ	Apu	$\int\frac{cdt}{T}$	s	γ	t
184	8.192_{181}	152.6	1138.1	985.5	915.7	69.8	0.2699	46.03_{94}	0.02172_{46}	**184**
185	8.373_{185}	153.6	1138.4	984.8	914.9	69.9	0.2714	45.09_{92}	0.02218_{46}	**185**
186	8.558_{188}	154.6	1138.7	984.1	914.1	70.0	0.2730	44.17_{89}	0.02264_{47}	**186**
187	8.746_{191}	155.6	1139.0	983.4	913.4	70.0	0.2745	43.28_{87}	0.02311_{47}	**187**
188	8.937_{195}	156.6	1139.3	982.7	912.6	70.1	0.2761	42.41_{85}	0.02358_{48}	**188**
189	9.132_{198}	157.6	1139.6	982.0	901.8	70.2	0.2777	41.56_{83}	0.02406_{49}	**189**
190	9.330_{202}	158.6	1139.9	981.3	911.0	70.3	0.2792	40.73_{81}	0.02455_{50}	**190**
191	9.532_{206}	159.6	1140.2	980.6	910.2	70.4	0.2808	39.92_{79}	0.02505_{51}	**191**
192	9.738_{209}	160.6	1140.5	979.9	909.4	70.5	0.2823	39.13_{78}	0.02556_{52}	**192**
193	9.947_{213}	161.6	1140.8	979.2	908.6	70.6	0.2838	38.35_{76}	0.02608_{52}	**193**
194	10.160_{217}	162.6	1141.1	978.5	907.8	70.7	0.2854	37.59_{74}	0.02660_{54}	**194**
195	10.377_{221}	163.7	1141.4	977.7	906.9	70.8	0.2869	36.85_{72}	0.02714_{54}	**195**
196	10.598_{224}	164.7	1141.7	977.0	906.2	70.8	0.2885	36.13_{71}	0.02768_{55}	**196**
197	10.822_{229}	165.7	1142.0	976.3	905.4	70.9	0.2900	35.42_{69}	0.02823_{56}	**197**
198	11.051_{232}	166.7	1142.3	975.6	904.6	71.0	0.2915	34.73_{67}	0.02879_{57}	**198**
199	11.283_{237}	167.7	1142.6	974.9	903.8	71.1	0.2930	34.06_{66}	0.02936_{58}	**199**
200	11.520_{241}	168.7	1142.9	974.2	903.0	71.2	0.2946	33.40_{64}	0.02994_{59}	**200**
201	11.761_{244}	169.7	1143.2	973.5	902.2	71.3	0.2961	32.76_{63}	0.03053_{59}	**201**
202	12.005_{249}	170.7	1143.6	972.9	901.5	71.4	0.2976	32.13_{61}	0.03112_{61}	**202**
203	12.254_{254}	171.7	1143.9	972.2	900.8	71.4	0.2991	31.52_{60}	0.03173_{62}	**203**
204	12.508_{257}	172.7	1144.2	971.5	900.0	71.5	0.3007	30.92_{59}	0.03235_{62}	**204**
205	12.765_{263}	173.7	1144.5	970.8	899.2	71.6	0.3022	30.33_{57}	0.03297_{66}	**205**
206	13.028_{266}	174.7	1144.8	970.1	898.4	71.7	0.3037	29.76_{57}	0.03361_{65}	**206**
207	13.294_{271}	175.8	1145.1	969.3	897.5	71.8	0.3052	29.19_{56}	0.03426_{67}	**207**
208	13.565_{276}	176.8	1145.4	968.6	896.7	71.9	0.3067	28.63_{54}	0.03493_{67}	**208**
209	13.841_{281}	177.8	1145.7	967.9	896.0	71.9	0.3082	28.09_{52}	0.03560_{68}	**209**
210	14.122_{285}	178.8	1146.0	967.2	895.2	72.0	0.3097	27.57_{52}	0.03628_{69}	**210**
211	14.407_{290}	179.8	1146.3	966.5	894.4	72.1	0.3112	27.05_{45}	0.03697_{63}	**211**
212	14.697_{293}	180.8	1146.6	965.8	893.5	72.3	0.3127	26.60_{44}	0.03760_{64}	**212**
213	14.990_{299}	181.8	1146.9	965.1	892.6	72.5	0.3142	26.16_{49}	0.03824_{72}	**213**
214	15.289_{303}	182.8	1147.2	964.4	891.8	72.6	0.3157	25.67_{48}	0.03896_{73}	**214**
215	15.592_{309}	183.8	1147.5	963.7	891.0	72.7	0.3172	25.19_{46}	0.03969_{74}	**215**
216	15.901_{313}	184.8	1147.8	963.0	890.2	72.8	0.3187	24.73_{45}	0.04043_{75}	**216**
217	16.214_{319}	185.8	1148.1	962.3	889.5	72.8	0.3202	24.28_{44}	0.04118_{76}	**217**
218	16.533_{324}	186.8	1148.4	961.6	888.7	72.9	0.3217	23.84_{43}	0.04194_{78}	**218**
219	16.857_{329}	187.8	1148.7	960.9	887.9	73.0	0.3232	23.41_{43}	0.04272_{80}	**219**
220	17.186_{335}	188.9	1149.0	960.1	887.1	73.0	0.3246	22.98_{42}	0.04352_{80}	**220**
221	17.521_{340}	189.9	1149.3	959.4	886.3	73.1	0.3261	22.56_{41}	0.04432	**221**

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int\frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
224	18.557_{357}	192.9	1150.3	957.4	884.0	73.4	0.3305	21.37_{38}	0.04679_{85}	**224**
225	18.914_{362}	193.9	1150.6	956.7	883.3	73.4	0.3320	20.99_{37}	0.04764_{86}	**225**
226	19.276_{368}	194.9	1150.9	956.0	882.5	73.5	0.3335	20.62_{37}	0.04850_{88}	**226**
227	19.644_{374}	195.9	1151.2	955.3	881.7	73.6	0.3349	20.25_{36}	0.04938_{90}	**227**
228	20.018_{379}	196.9	1151.5	954.6	880.9	73.7	0.3364	19.89_{35}	0.05028_{90}	**228**
229	20.397_{386}	197.9	1151.8	953.9	880.2	73.7	0.3379	19.54_{34}	0.05118_{90}	**229**
230	20.783_{392}	198.9	1152.1	953.2	879.4	73.8	0.3393	19.20_{33}	0.05208_{92}	**230**
231	21.175_{397}	199.9	1152.4	952.5	878.6	73.9	0.3408	18.87_{33}	0.05300_{94}	**231**
232	21.572_{404}	201.0	1152.7	951.7	877.8	73.9	0.3423	18.54_{32}	0.05394_{95}	**232**
233	21.976_{410}	202.0	1153.0	951.0	877.0	74.0	0.3437	18.22_{32}	0.05489_{97}	**233**
234	22.386_{417}	203.0	1153.3	950.3	876.2	74.1	0.3452	17.90_{31}	0.05586_{99}	**234**
235	22.803_{423}	204.0	1153.6	949.6	875.4	74.2	0.3466	17.59_{30}	0.05685_{99}	**235**
236	23.226_{429}	205.0	1153.9	948.9	874.6	74.3	0.3481	17.29_{30}	0.05784_{101}	**236**
237	23.655_{436}	206.0	1154.2	948.2	873.9	74.3	0.3495	16.99_{29}	0.05885_{102}	**237**
238	24.091_{442}	207.0	1154.5	947.5	873.1	74.4	0.3510	16.70_{28}	0.05987_{103}	**238**
239	24.533_{449}	208.0	1154.8	946.8	872.3	74.5	0.3524	16.42_{28}	0.06090_{105}	**239**
240	24.982_{456}	209.0	1155.1	946.1	871.6	74.5	0.3538	16.14_{27}	0.06195_{106}	**240**
241	25.438_{462}	210.0	1155.4	945.4	870.8	74.6	0.3553	15.87_{27}	0.06301_{108}	**241**
242	25.900_{470}	211.0	1155.8	944.8	870.1	74.7	0.3567	15.60_{26}	0.06409_{110}	**242**
243	26.370_{476}	212.0	1156.1	944.1	869.3	74.8	0.3581	15.34_{26}	0.06519_{111}	**243**
244	26.846_{484}	213.0	1156.4	943.4	868.5	74.9	0.3596	15.08_{25}	0.06630_{113}	**244**
245	27.330_{491}	214.1	1156.7	942.6	867.7	74.9	0.3610	14.83_{25}	0.06743_{115}	**245**
246	27.821_{498}	215.1	1157.0	941.9	866.9	75.0	0.3624	14.58_{24}	0.06858_{115}	**246**
247	28.319_{505}	216.1	1157.3	941.2	866.1	75.1	0.3639	14.34_{23}	0.06973_{116}	**247**
248	28.824_{512}	217.1	1157.6	940.5	865.3	75.2	0.3653	14.11_{23}	0.07089_{118}	**248**
249	29.336_{520}	218.1	1157.9	939.8	864.5	75.3	0.3667	13.88_{23}	0.07207_{120}	**249**
250	29.856_{528}	219.1	1158.2	939.1	863.8	75.3	0.3681	13.65_{22}	0.07327_{121}	**250**
251	30.384_{535}	220.1	1158.5	938.4	863.0	75.4	0.3695	13.43_{22}	0.07448_{123}	**251**
252	30.919_{543}	221.1	1158.8	937.7	862.2	75.5	0.3709	13.21_{22}	0.07571_{126}	**252**
253	31.462_{550}	222.1	1159.1	937.0	861.4	75.6	0.3724	12.99_{21}	0.07697_{128}	**253**
254	32.012_{559}	223.1	1159.4	936.3	860.7	75.6	0.3738	12.78_{21}	0.07825_{128}	**254**
255	32.571_{566}	224.1	1159.7	935.6	859.9	75.7	0.3752	12.57_{20}	0.07953_{129}	**255**
256	33.137_{574}	225.1	1160.0	934.9	859.1	75.8	0.3766	12.37_{20}	0.08082_{132}	**256**
257	33.711_{583}	226.2	1160.3	934.1	858.2	75.9	0.3780	12.17_{19}	0.08214_{133}	**257**
258	34.294_{590}	227.2	1160.6	933.4	857.5	75.9	0.3794	11.98_{19}	0.08347_{135}	**258**
259	34.884_{599}	228.2	1160.9	932.7	856.7	76.0	0.3808	11.79_{19}	0.08482_{137}	**259**
260	35.483_{607}	229.2	1161.2	932.0	855.9	76.1	0.3822	11.60_{18}	0.08619_{138}	**260**
261	36.090 [illegible]	230.2	1161.5	931.3	855.1	76.2	0.3836	11.42_{18}	0.08757_{140}	**261**

Degrees Fahr	Pressure, Pounds p Square Inch.	Heat of the Liqui	Total Heat.	Heat of Vaporizatio	Heat equivalen of Internal Work.	Heat equivalen of External Work.	Entropy of the Liquid.	Specific Volum	DENSITY. Weight, in Pounds, of one Cubic Foot.	Temperature, Degrees Fahr
	p	q	λ	r	ρ	Apu	$\int \frac{cdt}{T}$	s	γ	t
64	37.963_{641}	233.2	1162.5	929.3	852.9	76.4	0.3878	10.89_{17}	0.09182_{145}	264
65	38.604_{651}	234.2	1162.8	928.6	852.1	76.5	0.3891	10.72_{17}	0.09327_{147}	265
66	39.255_{659}	235.2	1163.1	927.9	851.3	76.6	0.3906	10.55_{16}	0.09474_{150}	266
67	39.914_{668}	236.2	1163.4	927.2	850.6	76.6	0.3919	10.39_{16}	0.09624_{151}	267
68	40.582_{677}	237.2	1163.7	926.5	849.8	76.7	0.3933	10.23_{16}	0.09775_{152}	268
69	41.259_{686}	238.2	1164.0	925.8	849.0	76.8	0.3947	10.07_{15}	0.09927_{153}	269
70	41.945_{695}	239.3	1164.3	925.0	848.1	76.9	0.3961	9.918_{152}	0.1008_{16}	270
71	42.640_{705}	240.3	1164.6	924.3	847.4	76.9	0.3975	9.766_{149}	0.1024_{16}	271
72	43.345_{714}	241.3	1164.9	923.6	846.6	77.0	0.3988	9.617_{146}	0.1040_{16}	272
73	44.059_{723}	242.3	1165.2	922.9	845.8	77.1	0.4002	9.471_{143}	0.1056_{16}	273
74	44.782_{733}	243.3	1165.5	922.2	845.0	77.2	0.4016	9.328_{141}	0.1072_{16}	274
75	45.515_{743}	244.3	1165.8	921.5	844.2	77.3	0.4030	9.187_{138}	0.1088_{17}	275
76	46.258_{753}	245.3	1166.1	920.8	843.5	77.3	0.4043	9.049_{136}	0.1105_{17}	276
77	47.011_{762}	246.3	1166.4	920.1	842.7	77.4	0.4057	8.913_{133}	0.1122_{17}	277
78	47.773_{772}	247.3	1166.7	919.4	841.9	77.5	0.4071	8.780_{131}	0.1139_{17}	278
79	48.545_{783}	248.3	1167.0	918.7	841.1	77.6	0.4084	8.649_{128}	0.1156_{17}	279
80	49.328_{792}	249.3	1167.3	918.0	840.4	77.6	0.4098	8.521_{126}	0.1173_{18}	280
81	50.12_{80}	250.3	1167.6	917.3	839.6	77.7	0.4112	8.395_{124}	0.1191_{18}	281
82	50.92_{82}	251.4	1168.0	916.6	838.8	77.8	0.4125	8.271_{122}	0.1209_{18}	282
83	51.74_{82}	252.4	1168.3	915.9	838.0	77.9	0.4139	8.149_{119}	0.1227_{18}	283
84	52.56_{83}	253.4	1168.6	915.2	837.2	78.0	0.4152	8.030_{117}	0.1245_{19}	284
85	53.39_{85}	254.4	1168.9	914.5	836.5	78.0	0.4166	7.913_{116}	0.1264_{19}	285
86	54.24_{85}	255.4	1169.2	913.8	835.7	78.1	0.4179	7.797_{113}	0.1283_{19}	286
87	55.09_{87}	256.4	1169.5	913.1	834.9	78.2	0.4193	7.684_{111}	0.1302_{19}	287
88	55.96_{87}	257.4	1169.8	912.4	834.1	78.3	0.4206	7.573_{109}	0.1321_{19}	288
89	56.83_{89}	258.4	1170.1	911.7	833.4	78.3	0.4220	7.464_{108}	0.1340_{19}	289
90	57.72_{90}	259.4	1170.4	911.0	832.6	78.4	0.4233	7.356_{105}	0.1359_{20}	290
91	58.62_{91}	260.4	1170.7	910.3	831.8	78.5	0.4247	7.251_{103}	0.1379_{20}	291
92	59.53_{92}	261.4	1171.0	909.6	831.0	78.6	0.4260	7.148_{102}	0.1399_{20}	292
93	60.45_{93}	262.4	1171.3	908.9	830.3	78.6	0.4273	7.046_{100}	0.1419_{21}	293
94	61.38_{95}	263.4	1171.6	908.2	829.5	78.7	0.4287	6.946_{99}	0.1440_{21}	294
95	62.33_{95}	264.5	1171.9	907.4	828.6	78.8	0.4300	6.847_{97}	0.1461_{21}	295
96	63.28_{97}	265.5	1172.2	906.7	827.8	78.9	0.4313	6.750_{95}	0.1482_{21}	296
97	64.25_{98}	266.5	1172.5	906.0	827.0	79.0	0.4327	6.655_{93}	0.1503_{21}	297
98	65.23_{99}	267.5	1172.8	905.3	826.3	79.0	0.4340	6.562_{92}	0.1524_{21}	298
99	66.22_{100}	268.5	1173.1	904.6	825.5	79.1	0.4353	6.470_{90}	0.1545_{22}	299
00	67.22_{102}	269.5	1173.4	903.9	824.7	79.2	0.4366	6.380_{88}	0.1567_{22}	300
01	68.24	270.5	1173.7	903.2	823.9	79.3	0.4380	6.292_{87}	0.1589_{22}	301

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	DENSITY. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
304	71.36_{106}	273.5	1174.7	901.2	821.7	79.5	0.4419	6.035_{83}	0.1657_{23}	**304**
305	72.42_{108}	274.5	1175.0	900.5	820.9	79.6	0.4433	5.952_{81}	0.1680_{23}	**305**
306	73.50_{109}	275.5	1175.3	899.8	820.1	79.7	0.4446	5.871_{80}	0.1703_{24}	**306**
307	74.59_{110}	276.6	1175.6	899.0	819.3	79.7	0.4459	5.791_{79}	0.1727_{24}	**307**
308	75.69_{111}	277.6	1175.9	898.3	818.5	79.8	0.4472	5.712_{78}	0.1751_{24}	**308**
309	76.80_{113}	278.6	1176.2	897.6	817.7	79.9	0.4485	5.634_{76}	0.1775_{24}	**309**
310	77.93_{114}	279.6	1176.5	896.9	817.0	79.9	0.4498	5.558_{74}	0.1799_{24}	**310**
311	79.07_{116}	280.6	1176.8	896.2	816.2	80.0	0.4511	5.484_{74}	0.1823_{25}	**311**
312	80.23_{116}	281.6	1177.1	895.5	815.4	80.1	0.4524	5.410_{73}	0.1848_{25}	**312**
313	81.39_{118}	282.7	1177.4	894.7	814.5	80.2	0.4538	5.337_{71}	0.1873_{26}	**313**
314	82.57_{120}	283.7	1177.7	894.0	813.8	80.2	0.4552	5.266_{71}	0.1899_{26}	**314**
315	83.77_{121}	284.8	1178.0	893.2	812.9	80.3	0.4565	5.195_{69}	0.1925_{26}	**315**
316	84.98_{122}	285.8	1178.3	892.5	812.1	80.4	0.4579	5.126_{68}	0.1951_{26}	**316**
317	86.20_{123}	286.9	1178.6	891.7	811.3	80.4	0.4592	5.058_{67}	0.1977_{27}	**317**
318	87.43_{125}	287.9	1178.9	891.0	810.5	80.5	0.4606	4.991_{66}	0.2004_{27}	**318**
319	88.68_{127}	289.0	1179.2	890.2	809.6	80.6	0.4619	4.925_{64}	0.2031_{27}	**319**
320	89.95_{128}	290.0	1179.5	889.5	808.8	80.7	0.4633	4.861_{64}	0.2058_{27}	**320**
321	91.23_{129}	291.0	1179.8	888.8	808.1	80.7	0.4646	4.797_{62}	0.2085_{27}	**321**
322	92.52_{130}	292.1	1180.2	888.1	807.3	80.8	0.4659	4.735_{62}	0.2112_{28}	**322**
323	93.82_{132}	293.1	1180.5	887.4	806.5	80.9	0.4672	4.673_{61}	0.2140_{28}	**323**
324	95.14_{134}	294.2	1180.8	886.6	805.7	80.9	0.4686	4.612_{60}	0.2168_{29}	**324**
325	96.48_{135}	295.2	1181.1	885.9	804.9	81.0	0.4699	4.552_{59}	0.2197_{29}	**325**
326	97.83_{137}	296.3	1181.4	885.1	804.1	81.1	0.4713	4.493_{57}	0.2226_{29}	**326**
327	99.20_{138}	297.3	1181.7	884.4	803.3	81.1	0.4726	4.436_{57}	0.2255_{29}	**327**
328	100.58_{139}	298.4	1182.0	883.6	802.4	81.2	0.4739	4.379_{56}	0.2284_{29}	**328**
329	101.97_{141}	299.4	1182.3	882.9	801.6	81.3	0.4752	4.323_{56}	0.2313_{30}	**329**
330	103.38_{143}	300.5	1182.6	882.1	800.8	81.3	0.4766	4.267_{54}	0.2343_{31}	**330**
331	104.81_{144}	301.5	1182.9	881.4	800.0	81.4	0.4779	4.213_{54}	0.2374_{30}	**331**
332	106.25_{145}	302.6	1183.2	880.6	799.1	81.5	0.4792	4.159_{52}	0.2404_{31}	**332**
333	107.70_{147}	303.6	1183.5	879.9	798.4	81.5	0.4805	4.107_{52}	0.2435_{31}	**333**
334	109.17_{149}	304.6	1183.8	879.2	797.6	81.6	0.4818	4.055_{51}	0.2466_{32}	**334**
335	110.66_{151}	305.7	1184.1	878.4	796.7	81.7	0.4832	4.004_{50}	0.2498_{31}	**335**
336	112.17_{152}	306.7	1184.4	877.7	796.0	81.7	0.4845	3.954_{50}	0.2529_{32}	**336**
337	113.69_{153}	307.8	1184.7	876.9	795.1	81.8	0.4858	3.904_{49}	0.2561_{33}	**337**
338	115.22_{155}	308.8	1185.0	876.2	794.3	81.9	0.4871	3.855_{48}	0.2594_{33}	**338**
339	116.77_{157}	309.9	1185.3	875.4	793.5	81.9	0.4884	3.807_{47}	0.2627_{33}	**339**
340	118.34_{159}	310.9	1185.6	874.7	792.7	82.0	0.4897	3.760_{47}	0.2660_{33}	**340**
341	119.93_{160}	312.0	1185.9	873.9	791.8	82.1	0.4910	3.713_{45}	0.2693_{33}	**341**

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int\frac{cdt}{T}$	Specific Volume. s	DENSITY. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
344	124.78$_{165}$	315.1	1186.9	871.8	789.5	82.3	0.4949	3.578$_{44}$	0.2795$_{35}$	**344**
345	126.43$_{167}$	316.1	1187.2	871.1	788.8	82.3	0.4962	3.534$_{43}$	0.2830$_{35}$	**345**
346	128.10$_{169}$	317.2	1187.5	870.3	787.9	82.4	0.4975	3.491$_{42}$	0.2865$_{35}$	**346**
347	129.79$_{170}$	318.2	1187.8	869.6	787.1	82.5	0.4988	3.449$_{42}$	0.2900$_{35}$	**347**
348	131.49$_{172}$	319.3	1188.1	868.8	786.3	82.5	0.5001	3.407$_{42}$	0.2935$_{36}$	**348**
349	133.21$_{174}$	320.3	1188.4	868.1	785.5	82.6	0.5014	3.365$_{41}$	0.2971$_{37}$	**349**
350	134.95$_{176}$	321.4	1188.7	867.3	784.7	82.6	0.5027	3.324$_{40}$	0.3008$_{37}$	**350**
351	136.71$_{177}$	322.4	1189.0	866.6	783.9	82.7	0.5040	3.284$_{39}$	0.3045$_{37}$	**351**
352	138.48$_{179}$	323.5	1189.3	865.8	783.0	82.8	0.5053	3.245$_{39}$	0.3082$_{37}$	**352**
353	140.27$_{181}$	324.5	1189.6	865.1	782.3	82.8	0.5066	3.206$_{38}$	0.3119$_{38}$	**353**
354	142.08$_{183}$	325.6	1189.9	864.3	781.4	82.9	0.5078	3.168$_{38}$	0.3157$_{38}$	**354**
355	143.91$_{184}$	326.6	1190.2	863.6	780.7	82.9	0.5091	3.130$_{38}$	0.3195$_{39}$	**355**
356	145.75$_{187}$	327.7	1190.5	862.8	779.8	83.0	0.5104	3.092$_{36}$	0.3234$_{38}$	**356**
357	147.62$_{188}$	328.7	1190.8	862.1	779.0	83.1	0.5117	3.056$_{36}$	0.3272$_{39}$	**357**
358	149.50$_{190}$	329.7	1191.1	861.4	778.3	83.1	0.5130	3.020$_{36}$	0.3311$_{40}$	**358**
359	151.40$_{193}$	330.8	1191.4	860.6	777.4	83.2	0.5142	2.984$_{35}$	0.3351$_{40}$	**359**
360	153.33$_{194}$	331.8	1191.7	859.9	776.7	83.2	0.5155	2.949$_{35}$	0.3391$_{40}$	**360**
361	155.27$_{195}$	332.9	1192.0	859.1	775.8	83.3	0.5168	2.914$_{34}$	0.3431$_{41}$	**361**
362	157.22$_{198}$	333.9	1192.4	858.5	775.2	83.3	0.5181	2.880$_{34}$	0.3472$_{41}$	**362**
363	159.20$_{200}$	335.0	1192.7	857.7	774.3	83.4	0.5193	2.846$_{33}$	0.3513$_{42}$	**363**
364	161.20$_{202}$	336.0	1193.0	857.0	773.5	83.5	0.5206	2.813$_{33}$	0.3555$_{42}$	**364**
365	163.22$_{203}$	337.1	1193.3	856.2	772.7	83.5	0.5219	2.780$_{32}$	0.3597$_{42}$	**365**
366	165.25$_{206}$	338.1	1193.6	855.5	771.9	83.6	0.5231	2.748$_{32}$	0.3639$_{43}$	**366**
367	167.31$_{208}$	339.2	1193.9	854.7	771.1	83.6	0.5244	2.716$_{31}$	0.3682$_{43}$	**367**
368	169.39$_{209}$	340.2	1194.2	854.0	770.4	83.6	0.5257	2.685$_{31}$	0.3725$_{43}$	**368**
369	171.48$_{212}$	341.3	1194.5	853.2	769.5	83.7	0.5269	2.654$_{31}$	0.3768$_{44}$	**369**
370	173.60$_{214}$	342.3	1194.8	852.5	768.7	83.8	0.5282	2.623$_{30}$	0.3812$_{44}$	**370**
371	175.74$_{215}$	343.3	1195.1	851.8	768.0	83.8	0.5294	2.593$_{30}$	0.3856$_{45}$	**371**
372	177.89$_{218}$	344.4	1195.4	851.0	767.1	83.9	0.5307	2.563$_{29}$	0.3901$_{45}$	**372**
373	180.07$_{220}$	345.5	1195.7	850.2	766.3	83.9	0.5320	2.534$_{29}$	0.3946$_{46}$	**373**
374	182.27$_{222}$	346.5	1196.0	849.5	765.5	84.0	0.5332	2.505$_{29}$	0.3992$_{46}$	**374**
375	184.49$_{224}$	347.5	1196.3	848.8	764.8	84.0	0.5345	2.476$_{28}$	0.4038$_{46}$	**375**
376	186.73$_{226}$	348.6	1196.6	848.0	763.9	84.1	0.5357	2.448$_{28}$	0.4084$_{47}$	**376**
377	188.99$_{228}$	349.6	1196.9	847.3	763.2	84.1	0.5370	2.420$_{27}$	0.4131$_{47}$	**377**
378	191.27$_{231}$	350.6	1197.2	846.6	762.4	84.2	0.5382	2.393$_{27}$	0.4178$_{49}$	**378**
379	193.58$_{233}$	351.7	1197.5	845.8	761.6	84.2	0.5395	2.366$_{28}$	0.4227$_{49}$	**379**
380	195.91$_{234}$	352.8	1197.8	845.0	760.8	84.2	0.5407	2.338$_{25}$	0.4276$_{47}$	**380**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**381**

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p		Heat of the Liquid q	Total Heat. λ	Heat of Vaporization r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid $\int \frac{dt}{T}$	Specific Volume s		Weight in Pounds of One Cubic Foot. γ		Temperature, Degrees Fahr. t
384	205.43	244	356.9	1199.1	842.2	757.8	84.4	0.5457	2.237	25	0.4470	51	384
385	207.87	246	358.0	1199.4	841.4	756.9	84.5	0.5469	2.212	25	0.4521	51	385
386	210.33	248	359.0	1199.7	840.7	756.2	84.5	0.5481	2.187	24	0.4572	51	386
387	212.81	250	360.1	1200.0	839.9	755.3	84.6	0.5494	2.163	24	0.4623	52	387
388	215.31	253	361.1	1200.3	839.2	754.6	84.6	0.5506	2.139	24	0.4675	53	388
389	217.84	255	362.2	1200.6	838.4	753.8	84.6	0.5518	2.115	23	0.4728	52	389
390	220.39	257	363.2	1200.9	837.7	753.0	84.7	0.5531	2.092	23	0.4780	53	390
391	222.96	260	364.3	1201.2	836.9	752.2	84.7	0.5543	2.069	23	0.4833	54	391
392	225.56	263	365.3	1201.5	836.2	751.4	84.8	0.5555	2.046	22	0.4887	54	392
393	228.19	264	366.4	1201.8	835.4	750.6	84.8	0.5568	2.024	22	0.4941	55	393
394	230.83	267	367.4	1202.1	834.7	749.9	84.8	0.5580	2.002	22	0.4996	55	394
395	233.50	269	368.4	1202.4	834.0	749.1	84.9	0.5592	1.980	22	0.5051	56	395
396	236.19	272	369.5	1202.7	833.2	748.3	84.9	0.5604	1.958	21	0.5107	56	396
397	238.91	274	370.5	1203.0	832.5	747.6	84.9	0.5616	1.937	21	0.5163	56	397
398	241.65	277	371.6	1203.3	831.7	746.7	85.0	0.5629	1.916	21	0.5219	58	398
399	244.42	279	372.6	1203.6	831.0	746.0	85.0	0.5641	1.895	21	0.5277	59	399
400	247.21	282	373.7	1203.9	830.2	745.2	85.0	0.5653	1.874	20	0.5336	58	400
401	250.03	284	374.7	1204.2	829.5	744.5	85.0	0.5665	1.854	20	0.5394	58	401
402	252.87	287	375.8	1204.6	828.8	743.7	85.1	0.5677	1.834	20	0.5452	60	402
403	255.74	289	376.8	1204.9	828.1	743.0	85.1	0.5689	1.814	20	0.5512	60	403
404	258.63	292	377.9	1205.2	827.3	742.2	85.1	0.5701	1.794	19	0.5572	61	404
405	261.55	295	378.9	1205.5	826.6	741.4	85.2	0.5714	1.775	19	0.5633	62	405
406	264.50	297	380.0	1205.8	825.8	740.6	85.2	0.5726	1.756	19	0.5695	61	406
407	267.47	300	381.0	1206.1	825.1	739.9	85.2	0.5738	1.737	18	0.5756	62	407
408	270.47	302	382.0	1206.4	824.4	739.2	85.2	0.5750	1.719	19	0.5818	63	408
409	273.49	305	383.1	1206.7	823.6	738.3	85.3	0.5762	1.700	18	0.5881	64	409
410	276.54	308	384.1	1207.0	822.9	737.6	85.3	0.5774	1.682	18	0.5945	65	410
411	279.62	311	385.2	1207.3	822.1	736.8	85.3	0.5786	1.664	18	0.601	6	411
412	282.73	313	386.2	1207.6	821.4	736.1	85.3	0.5798	1.646	17	0.607	7	412
413	285.86	316	387.3	1207.9	820.6	735.3	85.3	0.5810	1.629	17	0.614	6	413
414	289.02	319	388.3	1208.2	819.9	734.5	85.4	0.5822	1.612	17	0.620	7	414
415	292.21	321	389.4	1208.5	819.1	733.7	85.4	0.5834	1.595	17	0.627	7	415
416	295.42	325	390.4	1208.8	818.4	733.0	85.4	0.5846	1.578	17	0.634	7	416
417	298.67	327	391.5	1209.1	817.6	732.2	85.4	0.5858	1.561	16	0.641	6	417
418	301.94	330	392.5	1209.4	816.9	731.5	85.4	0.5870	1.545	17	0.647	7	418
419	305.24	333	393.6	1209.7	816.1	730.7	85.4	0.5881	1.528	16	0.654	7	419
420	308.57	336	394.6	1210.0	815.4	730.0	85.4	0.5893	1.512	16	0.661	7	420
421	311.93	[illegible]	395.6	1210.3	814.7	729.3	85.4	0.5905	1.496	[illegible]	0.668	[illegible]	421

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p		Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s		Density. Weight, in Pounds, of one Cubic Foot. γ		Temperature, Degrees Fahr. t
424	322.18	347	398.8	1211.3	812.5	727.0	85.5	0.5941	1.449	15	0.690	7	**424**
425	325.65	351	399.8	1211.6	811.8	726.3	85.5	0.5953	1.434	15	0.697	8	**425**
426	329.16	354	400.9	1211.9	811.0	725.5	85.5	0.5964	1.419	15	0.705	7	**426**
427	332.70	356	401.9	1212.2	810.3	724.8	85.5	0.5976	1.404	14	0.712	7	**427**
428	336.26		403.0	1212.5	809.5	724.0	85.5	0.5988	1.390		0.719		**428**

TABLE II.

SATURATED STEAM.

ENGLISH UNITS.

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Diff.	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{dq}{T}$	Specific Volume. s	Diff.	Density. Weight in Pounds of One Cubic Foot. γ	Diff.	Pressure, Pounds per Square Inch. p
1	101.99	2428	70.0	1113.1	1043.0	981.1	61.9	0.1329	334.6	161.0	0.00299	277	1
2	126.27	1535	94.4	1120.5	1026.1	961.9	64.2	0.1754	173.6	55.2	0.00576	268	2
3	141.62	1147	109.8	1125.1	1015.3	949.5	65.8	0.2013	118.4	28.1	0.00844	263	3
4	153.09	925	121.4	1128.6	1007.2	940.4	66.8	0.2203	90.31	17.09	0.01107	259	4
5	162.34	780	130.7	1131.5	1000.8	933.1	67.7	0.2353	73.22	11.55	0.01366	256	5
6	170.14	676	138.6	1133.8	995.2	926.7	68.5	0.2480	61.67	8.30	0.01622	252	6
7	176.90	602	145.4	1135.9	990.5	921.4	69.1	0.2587	53.37	6.30	0.01874	251	7
8	182.92	541	151.5	1137.7	986.2	916.5	69.7	0.2682	47.07	4.94	0.02125	249	8
9	188.33	492	156.9	1139.4	982.5	912.4	70.1	0.2766	42.13	3.97	0.02374	247	9
10	193.25	453	161.9	1140.9	979.0	908.4	70.6	0.2842	38.16	3.28	0.02621	245	10
11	197.78	420	166.5	1142.3	975.8	904.8	71.0	0.2912	34.88	2.74	0.02866	245	11
12	201.98	391	170.7	1143.6	972.9	901.5	71.4	0.2976	32.14	2.32	0.03111	244	12
13	205.89	368	174.6	1144.7	970.1	898.4	71.7	0.3035	29.82	2.03	0.03355	245	13
14	209.57	346	178.3	1145.8	967.5	895.5	72.0	0.3091	27.79	1.64	0.03600	226	14
15	213.03	329	181.8	1146.9	965.1	892.6	72.5	0.3143	26.15	1.56	0.03826	241	15
16	216.32	312	185.1	1147.9	962.8	890.0	72.8	0.3192	24.59	1.37	0.04067	240	16
17	219.44	296	188.3	1148.9	960.6	887.6	73.0	0.3238	23.22	1.22	0.04307	240	17
18	222.40	284	191.3	1149.8	958.5	885.3	73.2	0.3282	22.00	1.10	0.04547	239	18
19	225.24	271	194.1	1150.7	956.6	883.2	73.4	0.3324	20.90	0.99	0.04786	237	19
20	227.95	260	196.9	1151.5	954.6	881.0	73.6	0.3363	19.91	90	0.05023	236	20
21	230.55	251	199.5	1152.3	952.8	879.0	73.8	0.3401	19.01	81	0.05259	236	21
22	233.06	241	202.0	1153.0	951.0	877.0	74.0	0.3438	18.20	75	0.05495	236	22
23	235.47	232	204.5	1153.7	949.2	875.0	74.2	0.3473	17.45	69	0.05731	235	23
24	237.79	225	206.8	1154.4	947.6	873.2	74.4	0.3506	16.76	63	0.05966	233	24
25	240.04	217	209.1	1155.1	946.0	871.5	74.5	0.3539	16.13	58	0.06199	233	25
26	242.21	211	211.2	1155.8	944.6	869.9	74.7	0.3570	15.55	55	0.06432	234	26
27	244.32	204	213.4	1156.5	943.1	868.2	74.9	0.3600	15.00	51	0.06666	233	27
28	246.36	198	215.4	1157.1	941.7	866.7	75.0	0.3629	14.49	46	0.06899	231	28
29	248.34	193	217.4	1157.7	940.3	865.1	75.2	0.3657	14.03	44	0.07130	230	29
30	250.27	188	219.4	1158.3	938.9	863.6	75.3	0.3685	13.59	41	0.07360	230	30
31	252.15	183	221.3	1158.8	937.5	862.0	75.5	0.3712	13.18	40	0.07590	231	31
32	253.98	178	223.1	1159.4	936.3	860.7	75.6	0.3737	12.78	37	0.07821	230	32
33	255.76	[illegible]	224.9	1159.9	935.0	859.2	75.8	0.3762	12.41	[illegible]	0.08051	[illegible]	33

Pressure, Pounds pe Square Inch. p	Temperature, Degrees Fahr t	Heat of the Liquid q	Total Heat. λ	Heat of Vaporization r	Heat equivalen of Internal Work. ρ	Heat equivalen of External Work. Apu	Entropy of the Liquid $\int \frac{cdt}{T}$	Specific Volume s	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds pe Square Inch. p
34	257.50_{169}	226.7	1160.4	933.7	857.8	75.9	0.3787	12.07_{32}	0.08280_{228}	34
35	259.19_{166}	228.4	1161.0	932.6	856.6	76.0	0.3811	11.75_{30}	0.08508_{228}	35
36	260.85_{162}	230.0	1161.5	931.5	855.3	76.2	0.3834	11.45_{29}	0.08736_{228}	36
37	262.47_{159}	231.7	1162.0	930.3	854.0	76.3	0.3856	11.16_{28}	0.08964_{227}	37
38	264.06_{155}	233.3	1162.5	929.2	852.8	76.4	0.3878	10.88_{26}	0.09191_{226}	38
39	265.61_{151}	234.8	1163.0	928.2	851.7	76.5	0.3900	10.62_{25}	0.09417_{227}	39
40	267.13_{149}	236.4	1163.4	927.0	850.3	76.7	0.3921	10.37_{24}	0.09644_{225}	40
41	268.62_{146}	237.9	1163.9	926.0	849.2	76.8	0.3942	10.13_{22}	0.09869_{221}	41
42	270.08_{143}	239.3	1164.3	925.0	848.1	76.9	0.3962	9.906_{216}	0.1009_{23}	42
43	271.51_{140}	240.8	1164.8	924.0	847.0	77.0	0.3982	9.690_{206}	0.1032_{22}	43
44	272.91_{138}	242.2	1165.2	923.0	845.9	77.1	0.4001	9.484_{197}	0.1054_{23}	44
45	274.29_{136}	243.6	1165.6	922.0	844.8	77.2	0.4020	9.287_{190}	0.1077_{22}	45
46	275.65_{134}	245.0	1166.0	921.0	843.7	77.3	0.4038	9.097_{183}	0.1099_{23}	46
47	276.99_{131}	246.3	1166.4	920.1	842.7	77.4	0.4056	8.914_{174}	0.1122_{22}	47
48	278.30_{128}	247.6	1166.8	919.2	841.7	77.5	0.4074	8.740_{167}	0.1144_{22}	48
49	279.58_{127}	248.9	1167.2	918.3	840.7	77.6	0.4092	8.573_{159}	0.1166_{22}	49
50	280.85_{125}	250.2	1167.6	917.4	839.7	77.7	0.4109	8.414_{155}	0.1188_{23}	50
51	282.10_{122}	251.5	1168.0	916.5	838.7	77.8	0.4126	8.259_{149}	0.1211_{22}	51
52	283.32_{121}	252.7	1168.4	915.7	837.8	77.9	0.4143	8.110_{142}	0.1233_{22}	52
53	284.53_{119}	253.9	1168.7	914.8	836.8	78.0	0.4160	7.968_{138}	0.1255_{22}	53
54	285.72_{117}	255.1	1169.1	914.0	835.9	78.1	0.4175	7.820_{133}	0.1277_{22}	54
55	286.89_{116}	256.3	1169.4	913.1	834.9	78.2	0.4191	7.696_{128}	0.1299_{22}	55
56	288.05_{114}	257.5	1169.8	912.3	834.0	78.3	0.4207	7.568_{125}	0.1321_{23}	56
57	289.19_{112}	258.6	1170.1	911.5	833.1	78.4	0.4222	7.443_{120}	0.1344_{22}	57
58	290.31_{111}	259.7	1170.5	910.8	832.4	78.4	0.4237	7.323_{115}	0.1366_{21}	58
59	291.42_{109}	260.8	1170.8	910.0	831.5	78.5	0.4252	7.208_{112}	0.1387_{22}	59
60	292.51_{108}	261.9	1171.2	909.3	830.7	78.6	0.4267	7.096_{109}	0.1409_{22}	60
61	293.59_{106}	263.0	1171.5	908.5	829.8	78.7	0.4281	6.987_{105}	0.1431_{22}	61
62	294.65_{105}	264.1	1171.8	907.7	828.9	78.8	0.4295	6.882_{103}	0.1453_{22}	62
63	295.70_{104}	265.2	1172.1	906.9	828.0	78.9	0.4309	6.779_{99}	0.1475_{22}	63
64	296.74_{103}	266.2	1172.4	906.2	827.3	78.9	0.4323	6.680_{97}	0.1497_{22}	64
65	297.77_{101}	267.2	1172.7	905.5	826.5	79.0	0.4337	6.583_{93}	0.1519_{22}	65
66	298.78_{99}	268.3	1173.0	904.7	825.6	79.1	0.4350	6.490_{89}	0.1541_{21}	66
67	299.77_{99}	269.3	1173.3	904.0	824.8	79.2	0.4363	6.401_{87}	0.1562_{22}	67
68	300.76_{98}	270.3	1173.6	903.3	824.1	79.2	0.4376	6.314_{86}	0.1584_{22}	68
69	301.74_{97}	271.2	1173.9	902.7	823.4	79.3	0.4389	6.228_{84}	0.1606_{22}	69
70	302.71_{95}	272.2	1174.3	902.1	822.7	79.4	0.4402	6.144_{81}	0.1628_{21}	70
71	303.66_{95}	273.2	1174.6	901.4	821.9	79.5	0.4415	6.063_{79}	0.1649_{22}	71

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Diff.	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{dq}{T}$	Specific Volume. s	Diff.	DENSITY. Weight, Pounds, per Cubic Foot. γ
74	306.46	92	276.0	1175.4	899.4	819.7	79.7	0.4452	5.831	69	0.1714
75	307.38	90	276.9	1175.7	898.8	819.1	79.7	0.4464	5.762	71	0.1736
76	308.28	90	277.8	1176.0	898.2	818.4	79.8	0.4476	5.691	70	0.1757
77	309.18	88	278.7	1176.2	897.5	817.6	79.9	0.4487	5.621	67	0.1779
78	310.06	88	279.6	1176.5	896.9	817.0	79.9	0.4499	5.554	66	0.1801
79	310.94	86	280.5	1176.8	896.3	816.3	80.0	0.4511	5.488	63	0.1822
80	311.80	86	281.4	1177.0	895.6	815.5	80.1	0.4522	5.425	63	0.1843
81	312.66	85	282.3	1177.3	895.0	814.9	80.1	0.4534	5.362	61	0.1865
82	313.51	85	283.2	1177.6	894.4	814.2	80.2	0.4545	5.301	61	0.1886
83	314.36	83	284.1	1177.8	893.7	813.4	80.3	0.4557	5.240	58	0.1908
84	315.19	83	285.0	1178.1	893.1	812.8	80.3	0.4568	5.182	57	0.1930
85	316.02	82	285.8	1178.3	892.5	812.1	80.4	0.4579	5.125	56	0.1951
86	316.84	81	286.7	1178.6	891.9	811.5	80.4	0.4590	5.069	55	0.1973
87	317.65	80	287.5	1178.8	891.3	810.8	80.5	0.4601	5.014	53	0.1994
88	318.45	80	288.4	1179.1	890.7	810.2	80.5	0.4612	4.961	52	0.2016
89	319.25	79	289.2	1179.3	890.1	809.5	80.6	0.4622	4.909	51	0.2037
90	320.04	77	290.0	1179.6	889.6	808.9	80.7	0.4633	4.858	50	0.2059
91	320.83	77	290.8	1179.8	889.0	808.3	80.7	0.4643	4.808	48	0.2080
92	321.60	77	291.6	1180.0	888.4	807.6	80.8	0.4653	4.760	48	0.2101
93	322.37	77	292.4	1180.3	887.9	807.1	80.8	0.4663	4.712	47	0.2122
94	323.14	75	293.2	1180.5	887.3	806.4	80.9	0.4673	4.665	46	0.2144
95	323.89	75	294.0	1180.7	886.7	805.8	80.9	0.4683	4.619	45	0.2165
96	324.64	74	294.8	1181.0	886.2	805.2	81.0	0.4693	4.574	44	0.2186
97	325.38	74	295.6	1181.2	885.6	804.6	81.0	0.4703	4.530	44	0.2207
98	326.12	74	296.4	1181.4	885.0	803.9	81.1	0.4713	4.486	42	0.2228
99	326.86	72	297.1	1181.6	884.5	803.4	81.1	0.4723	4.444	41	0.2249
100	327.58	72	297.9	1181.9	884.0	802.8	81.2	0.4733	4.403	41	0.2271
101	328.30	72	298.6	1182.1	883.5	802.3	81.2	0.4743	4.362	40	0.2292
102	329.02	71	299.4	1182.3	882.9	801.6	81.3	0.4753	4.322	40	0.2314
103	329.73	70	300.1	1182.5	882.4	801.1	81.3	0.4762	4.282	38	0.2335
104	330.43	70	300.9	1182.7	881.8	800.4	81.4	0.4771	4.244	38	0.2356
105	331.13	70	301.6	1182.9	881.3	799.9	81.4	0.4780	4.206	37	0.2377
106	331.83	69	302.3	1183.1	880.8	799.3	81.5	0.4790	4.169	37	0.2398
107	332.52	68	303.0	1183.4	880.4	798.9	81.5	0.4799	4.132	36	0.2419
108	333.20	68	303.8	1183.6	879.8	798.2	81.6	0.4808	4.096	35	[illegible]
109	333.88	[illegible]	304.5	1183.8	879.3	797.7	81.6	0.4817	[illegible]	[illegible]	[illegible]

Pressure, Pounds pe[r] Square Inch. p	Temperature, Degrees Fahr[.] t	Heat of the Liquid q	Total Heat. λ	Heat of Vaporization r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid $\int \frac{c\,dt}{T}$	Specific Volume s	DENSITY. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
114	337.20_{66}	308.0	1184.8	876.8	795.0	81.8	0.4860	3.894_{32}	0.2568_{21}	**114**
115	337.86_{64}	308.7	1185.0	876.3	794.4	81.9	0.4869	3.862_{31}	0.2589_{21}	**115**
116	338.50_{64}	309.4	1185.2	875.8	793.9	81.9	0.4877	3.831_{30}	0.2610_{21}	**116**
117	339.14_{64}	310.0	1185.4	875.4	793.5	81.9	0.4886	3.801_{31}	0.2631_{22}	**117**
118	339.78_{64}	310.7	1185.6	874.9	792.9	82.0	0.4894	3.770_{30}	0.2653_{21}	**118**
119	340.42_{63}	311.4	1185.8	874.4	792.4	82.0	0.4903	3.740_{29}	0.2674_{21}	**119**
120	341.05_{62}	312.0	1186.0	874.0	791.9	82.1	0.4911	3.711_{28}	0.2695_{20}	**120**
121	341.67_{62}	312.7	1186.2	873.5	791.4	82.1	0.4919	3.683_{28}	0.2715_{21}	**121**
122	342.29_{62}	313.3	1186.3	873.0	790.8	82.2	0.4927	3.655_{28}	0.2736_{21}	**122**
123	342.91_{61}	314.0	1186.5	872.5	790.3	82.2	0.4935	3.627_{28}	0.2757_{22}	**123**
124	343.52_{61}	314.6	1186.7	872.1	789.9	82.2	0.4943	3.599_{27}	0.2779_{21}	**124**
125	344.13_{60}	315.2	1186.9	871.7	789.4	82.3	0.4951	3.572_{26}	0.2800_{20}	**125**
126	344.73_{60}	315.9	1187.1	871.2	788.9	82.3	0.4959	3.546_{26}	0.2820_{21}	**126**
127	345.33_{60}	316.5	1187.3	870.8	788.4	82.4	0.4967	3.520_{26}	0.2841_{21}	**127**
128	345.93_{60}	317.1	1187.4	870.3	787.9	82.4	0.4974	3.494_{25}	0.2862_{21}	**128**
129	346.53_{59}	317.7	1187.6	869.9	787.5	82.4	0.4982	3.469_{25}	0.2883_{21}	**129**
130	347.12_{59}	318.4	1187.8	869.4	786.9	82.5	0.4990	3.444_{25}	0.2904_{21}	**130**
131	347.71_{58}	319.0	1188.0	869.0	786.5	82.5	0.4997	3.419_{24}	0.2925_{21}	**131**
132	348.29_{58}	319.6	1188.2	868.6	786.1	82.5	0.5005	3.395_{24}	0.2946_{21}	**132**
133	348.87_{58}	320.2	1188.4	868.2	785.6	82.6	0.5012	3.371_{24}	0.2967_{21}	**133**
134	349.45_{58}	320.8	1188.5	867.7	785.1	82.6	0.5020	3.347_{24}	0.2988_{21}	**134**
135	350.03_{57}	321.4	1188.7	867.3	784.7	82.6	0.5027	3.323_{23}	0.3009_{21}	**135**
136	350.60_{57}	322.0	1188.9	866.9	784.2	82.7	0.5035	3.300_{23}	0.3030_{21}	**136**
137	351.17_{56}	322.6	1189.0	866.4	783.7	82.7	0.5042	3.277_{22}	0.3051_{21}	**137**
138	351.73_{56}	323.2	1189.2	866.0	783.3	82.7	0.5049	3.255_{21}	0.3072_{20}	**138**
139	352.29_{56}	323.8	1189.4	865.6	782.8	82.8	0.5056	3.234_{22}	0.3092_{21}	**139**
140	352.85_{55}	324.4	1189.5	865.1	782.3	82.8	0.5064	3.212_{21}	0.3113_{21}	**140**
141	353.40_{55}	325.0	1189.7	864.7	781.9	82.8	0.5071	3.191_{21}	0.3134_{21}	**141**
142	353.95_{55}	325.6	1189.9	864.3	781.4	82.9	0.5078	3.170_{21}	0.3155_{21}	**142**
143	354.50_{55}	326.1	1190.1	864.0	781.1	82.9	0.5085	3.149_{21}	0.3176_{21}	**143**
144	355.05_{54}	326.7	1190.2	863.5	780.6	82.9	0.5092	3.128_{21}	0.3197_{21}	**144**
145	355.59_{54}	327.2	1190.4	863.2	780.2	83.0	0.5099	3.107_{20}	0.3218_{21}	**145**
146	356.13_{54}	327.8	1190.6	862.8	779.8	83.0	0.5106	3.087_{19}	0.3239_{20}	**146**
147	356.67_{53}	328.3	1190.7	862.4	779.4	83.0	0.5113	3.068_{19}	0.3259_{21}	**147**
148	357.20_{53}	328.9	1190.9	862.0	778.9	83.1	0.5119	3.049_{19}	0.3280_{20}	**148**
149	357.73_{53}	329.4	1191.0	861.6	778.5	83.1	0.5126	3.030_{19}	0.3300_{21}	**149**
150	358.26_{52}	330.0	1191.2	861.2	778.1	83.1	0.5133	3.011_{19}	0.3321_{21}	**150**
151	358.78_{52}	330.5	1191.4	860.9	777.7	83.2	0.5140	2.992_{19}	0.3342_{21}	**151**

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{dt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
154	360.34_{52}	332.2	1191.8	859.6	776.3	83.3	0.5160	2.937_{18}	0.3405_{21}	154
155	360.86_{51}	332.7	1192.0	859.3	776.0	83.3	0.5166	2.919_{18}	0.3426_{21}	155
156	361.37_{51}	333.3	1192.2	858.9	775.6	83.3	0.5173	2.901_{17}	0.3447_{20}	156
157	361.88_{51}	333.8	1192.3	858.5	775.2	83.3	0.5179	2.884_{17}	0.3467_{21}	157
158	362.39_{51}	334.3	1192.5	858.2	774.8	83.4	0.5186	2.867_{17}	0.3488_{21}	158
159	362.90_{50}	334.9	1192.7	857.8	774.4	83.4	0.5192	2.850_{17}	0.3509_{21}	159
160	363.40_{50}	335.4	1192.8	857.4	774.0	83.4	0.5198	2.833_{17}	0.3530_{21}	160
161	363.90_{50}	335.9	1193.0	857.1	773.7	83.4	0.5205	2.816_{17}	0.3551_{21}	161
162	364.40_{50}	336.4	1193.1	856.7	772.2	83.5	0.5211	2.799_{16}	0.3572_{21}	162
163	364.90_{49}	337.0	1193.3	856.3	772.8	83.5	0.5217	2.783_{16}	0.3593_{21}	163
164	365.39_{49}	337.5	1193.4	855.9	772.4	83.5	0.5224	2.767_{16}	0.3614_{21}	164
165	365.88_{49}	338.0	1193.6	855.6	772.0	83.6	0.5230	2.751_{15}	0.3635_{20}	165
166	366.37_{48}	338.5	1193.7	855.2	771.6	83.6	0.5236	2.736_{15}	0.3655_{20}	166
167	366.85_{48}	339.0	1193.9	854.9	771.3	83.6	0.5242	2.721_{15}	0.3675_{20}	167
168	367.33_{48}	339.5	1194.0	854.5	770.9	83.6	0.5248	2.706_{15}	0.3695_{21}	168
169	367.81_{48}	340.0	1194.2	854.2	770.5	83.7	0.5254	2.691_{15}	0.3716_{21}	169
170	368.29_{48}	340.5	1194.3	853.8	770.1	83.7	0.5260	2.676_{15}	0.3737_{21}	170
171	368.77_{47}	341.0	1194.4	853.4	769.7	83.7	0.5266	2.661_{14}	0.3758_{20}	171
172	369.24_{47}	341.5	1194.6	853.1	769.4	83.7	0.5272	2.647_{15}	0.3778_{21}	172
173	369.71_{47}	342.0	1194.7	852.7	768.9	83.8	0.5278	2.632_{14}	0.3799_{21}	173
174	370.18_{47}	342.5	1194.8	852.3	768.5	83.8	0.5284	2.618_{15}	0.3820_{21}	174
175	370.65_{47}	343.0	1195.0	852.0	768.2	83.8	0.5290	2.603_{14}	0.3841_{21}	175
176	371.12_{47}	343.5	1195.1	851.6	767.8	83.8	0.5296	2.589_{14}	0.3862_{21}	176
177	371.59_{46}	344.0	1195.3	851.3	767.5	83.8	0.5302	2.575_{14}	0.3883_{21}	177
178	372.05_{46}	344.4	1195.4	851.0	767.1	83.9	0.5308	2.561_{13}	0.3904_{21}	178
179	372.51_{46}	344.9	1195.6	850.7	766.8	83.9	0.5313	2.548_{13}	0.3925_{20}	179
180	372.97_{46}	345.4	1195.7	850.3	766.4	83.9	0.5319	2.535_{13}	0.3945_{21}	180
181	373.43_{45}	345.9	1195.9	850.0	766.1	83.9	0.5325	2.522_{14}	0.3966_{21}	181
182	373.88_{45}	346.4	1196.0	849.6	765.6	84.0	0.5331	2.508_{13}	0.3987_{21}	182
183	374.33_{45}	346.8	1196.1	849.3	765.3	84.0	0.5336	2.495_{13}	0.4008_{21}	183
184	374.78_{45}	347.3	1196.2	848.9	764.9	84.0	0.5342	2.482_{12}	0.4029_{20}	184
185	375.23_{45}	347.8	1196.4	848.6	764.6	84.0	0.5347	2.470_{13}	0.4049_{21}	185
186	375.68_{44}	348.2	1196.5	848.3	764.3	84.0	0.5353	2.457_{12}	0.4070_{20}	186
187	376.12_{44}	348.7	1196.6	847.9	763.8	84.1	0.5359	2.445_{13}	0.4090_{21}	187
188	376.56_{44}	349.2	1196.8	847.6	763.5	84.1	0.5364	2.432_{12}	0.4111_{21}	188
189	377.00_{44}	349.6	1196.9	847.3	763.2	84.1	0.5370	2.420_{12}	0.4132_{21}	189
190	377.44_{44}	350.1	1197.1	847.0	762.9	84.1	0.5375	2.408_{12}	0.4153_{21}	190

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int\frac{cdt}{T}$	Specific Volume. s	DENSITY. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
194	379.18_{43}	351.9	1197.6	845.7	761.5	84.2	0.5397	2.361_{12}	0.4236_{21}	194
195	379.61_{43}	352.4	1197.7	845.3	761.1	84.2	0.5402	2.349_{12}	0.4257_{21}	195
196	380.04_{43}	352.8	1197.8	845.0	760.8	84.2	0.5408	2.337_{12}	0.4278_{20}	196
197	380.47_{42}	353.3	1198.0	844.7	760.4	84.3	0.5413	2.325_{11}	0.4298_{20}	197
198	380.89_{42}	353.7	1198.1	844.4	760.1	84.3	0.5418	2.314_{10}	0.4318_{20}	198
199	381.31_{42}	354.1	1198.2	844.1	759.8	84.3	0.5423	2.304_{10}	0.4338_{21}	199
200	381.73_{42}	354.6	1198.4	843.8	759.5	84.3	0.5429	2.294_{10}	0.4359_{20}	200
201	382.15_{42}	355.0	1198.5	843.5	759.1	84.4	0.5434	2.284_{10}	0.4379_{20}	201
202	382.57_{42}	355.4	1198.6	843.2	758.8	84.4	0.5439	2.274_{11}	0.4399_{21}	202
203	382.99_{42}	355.9	1198.8	842.9	758.5	84.4	0.5444	2.263_{11}	0.4420_{21}	203
204	383.41_{41}	356.3	1198.9	842.6	758.2	84.4	0.5449	2.252_{11}	0.4441_{20}	204
205	383.82_{41}	356.8	1199.0	842.2	757.8	84.4	0.5454	2.241_{10}	0.4461_{21}	205
206	384.23_{41}	357.2	1199.1	841.9	757.4	84.5	0.5459	2.231_{10}	0.4482_{21}	206
207	384.64_{41}	357.6	1199.3	841.7	757.2	84.5	0.5465	2.221_{10}	0.4503_{21}	207
208	385.05_{41}	358.0	1199.4	841.4	756.9	84.5	0.5470	2.211_{11}	0.4524_{20}	208
209	385.46_{41}	358.5	1199.5	841.0	756.5	84.5	0.5475	2.200_{10}	0.4544_{21}	209
210	385.87_{41}	358.9	1199.6	840.7	756.2	84.5	0.5480	2.190_{10}	0.4565_{21}	210
211	386.28_{40}	359.3	1199.8	840.5	756.0	84.5	0.5485	2.180_{9}	0.4586_{21}	211
212	386.68_{40}	359.7	1199.9	840.2	755.6	84.6	0.5489	2.171_{9}	0.4607_{20}	212
213	387.08_{40}	360.1	1200.0	839.9	755.3	84.6	0.5494	2.162_{10}	0.4627_{21}	213
214	387.48_{40}	360.6	1200.1	839.5	754.9	84.6	0.5499	2.152_{10}	0.4648_{21}	214
215	387.88_{40}	361.0	1200.2	839.2	754.6	84.6	0.5504	2.142_{10}	0.4669_{21}	215
216	388.28_{39}	361.4	1200.4	839.0	754.4	84.6	0.5509	2.132_{9}	0.4690_{21}	216
217	388.67_{39}	361.8	1200.5	838.7	754.1	84.6	0.5514	2.123_{9}	0.4711_{20}	217
218	389.06_{39}	362.2	1200.6	838.4	753.8	84.6	0.5519	2.114_{9}	0.4731_{20}	218
219	389.45_{39}	362.6	1200.7	838.1	753.4	84.7	0.5524	2.105_{9}	0.4751_{21}	219
220	389.84_{39}	363.0	1200.8	837.8	753.1	84.7	0.5529	2.096_{9}	0.4772_{20}	220
221	390.23_{39}	363.5	1201.0	837.5	752.8	84.7	0.5533	2.087_{9}	0.4792_{21}	221
222	390.62_{39}	363.9	1201.1	837.2	752.5	84.7	0.5538	2.078_{9}	0.4813_{21}	222
223	391.01_{39}	364.3	1201.2	836.9	752.2	84.7	0.5543	2.069_{9}	0.4834_{21}	223
224	391.40_{39}	364.7	1201.3	836.6	751.9	84.7	0.5548	2.060_{9}	0.4855_{21}	224
225	391.79_{38}	365.1	1201.4	836.3	751.6	84.7	0.5553	2.051_{9}	0.4876_{21}	225
226	392.17_{38}	365.5	1201.6	836.1	751.3	84.8	0.5557	2.042_{8}	0.4896_{21}	226
227	392.55_{38}	365.9	1201.7	835.8	751.0	84.8	0.5562	2.034_{8}	0.4917_{20}	227
228	392.93_{38}	366.3	1201.8	835.5	750.7	84.8	0.5567	2.026_{9}	0.4939_{20}	228
229	393.31_{38}	366.7	1201.9	835.2	750.4	84.8	0.5571	2.017_{8}	0.4959_{20}	229
230	393.69_{38}	367.1	1202.0	834.9	750.1	84.8	0.5576	2.009_{8}	0.4979_{21}	230
231	394.07	367.5	1202.1	834.6	749.8	84.8	0.5581	2.001	0.5000	231

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{dt}{T}$	Specific Volume s	Density. Weight in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
234	395.19_{37}	368.6	1202.5	833.9	749.0	84.9	0.5594	1.976_{8}	0.5062_{20}	234
235	395.56_{37}	369.0	1202.6	833.6	748.7	84.9	0.5599	1.968_{8}	0.5082_{21}	235
236	395.93_{37}	369.4	1202.7	833.3	748.4	84.9	0.5603	1.960_{8}	0.5103_{20}	236
237	396.30_{37}	369.8	1202.8	833.0	748.1	84.9	0.5608	1.952_{8}	0.5123_{21}	237
238	396.67_{37}	370.2	1202.9	832.7	747.8	84.9	0.5612	1.944_{8}	0.5144_{21}	238
239	397.04_{37}	370.6	1203.0	832.4	747.5	84.9	0.5617	1.936_{8}	0.5165_{21}	239
240	397.41_{36}	371.0	1203.2	832.2	747.3	84.9	0.5621	1.928_{7}	0.5186_{20}	240
241	397.77_{36}	371.3	1203.3	832.0	747.0	85.0	0.5626	1.921_{8}	0.5206_{20}	241
242	398.13_{36}	371.7	1203.4	831.7	746.7	85.0	0.5630	1.913_{7}	0.5226_{21}	242
243	398.49_{36}	372.1	1203.5	831.4	746.4	85.0	0.5635	1.906_{8}	0.5247_{21}	243
244	398.85_{36}	372.5	1203.6	831.1	746.1	85.0	0.5639	1.898_{7}	0.5268_{21}	244
245	399.21_{36}	372.8	1203.7	830.9	745.9	85.0	0.5643	1.891_{8}	0.5289_{22}	245
246	399.57_{36}	373.2	1203.8	830.6	745.6	85.0	0.5648	1.883_{8}	0.5311_{21}	246
247	399.93_{36}	373.6	1203.9	830.3	745.3	85.0	0.5652	1.875_{7}	0.5332_{21}	247
248	400.29_{35}	374.0	1204.0	830.0	745.0	85.0	0.5656	1.868_{7}	0.5353_{20}	248
249	400.64_{35}	374.3	1204.1	829.8	744.8	85.0	0.5661	1.861_{7}	0.5373_{20}	249
250	400.99_{35}	374.7	1204.2	829.5	744.5	85.0	0.5665	1.854_{7}	0.5393_{20}	250
251	401.34_{35}	375.1	1204.4	829.3	744.2	85.1	0.5669	1.847_{7}	0.5413_{20}	251
252	401.69_{35}	375.4	1204.5	829.1	744.0	85.1	0.5673	1.840_{7}	0.5433_{21}	252
253	402.04_{35}	375.8	1204.6	828.8	743.7	85.1	0.5678	1.833_{7}	0.5454_{21}	253
254	402.39_{35}	376.2	1204.7	828.5	743.4	85.1	0.5682	1.826_{7}	0.5475_{21}	254
255	402.74_{35}	376.5	1204.8	828.3	743.2	85.1	0.5686	1.819_{7}	0.5496_{21}	255
256	403.09_{35}	376.9	1204.9	828.0	742.9	85.1	0.5690	1.812_{7}	0.5517_{21}	256
257	403.44_{35}	377.3	1205.0	827.7	742.6	85.1	0.5695	1.805_{7}	0.5538_{21}	257
258	403.79_{34}	377.6	1205.1	827.5	742.4	85.1	0.5699	1.798_{6}	0.5559_{21}	258
259	404.13_{34}	378.0	1205.2	827.2	742.1	85.1	0.5703	1.792_{7}	0.5580_{21}	259
260	404.47_{34}	378.4	1205.3	826.9	741.7	85.2	0.5707	1.785_{6}	0.5601_{20}	260
261	404.81_{34}	378.7	1205.4	826.7	741.5	85.2	0.5711	1.779_{6}	0.5621_{21}	261
262	405.15_{34}	379.1	1205.5	826.4	741.2	85.2	0.5715	1.773_{7}	0.5642_{21}	262
263	405.49_{34}	379.4	1205.6	826.2	741.0	85.2	0.5719	1.766_{7}	0.5663_{21}	263
264	405.83_{34}	379.8	1205.7	825.9	740.7	85.2	0.5724	1.759_{6}	0.5684_{21}	264
265	406.17_{34}	380.2	1205.8	825.6	740.4	85.2	0.5728	1.753_{7}	0.5705_{21}	265
266	406.51_{33}	380.5	1205.9	825.4	740.2	85.2	0.5732	1.746_{6}	0.5726_{20}	266
267	406.84_{34}	380.8	1206.0	825.2	740.0	85.2	0.5736	1.740_{6}	0.5746_{21}	267
268	407.18_{34}	381.2	1206.1	824.9	739.7	85.2	0.5740	1.734_{6}	0.5767_{21}	268
269	407.52_{33}	381.5	1206.2	824.7	739.5	85.2	0.5744	1.728_{6}	0.5788_{21}	269
270	407.85_{33}	381.9	1206.3	824.4	739.2	85.2	0.5748	1.722_{6}	0.5809_{20}	270

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
274	409.17_{33}	383.3	1206.7	823.4	738.1	85.3	0.5764	1.697_{6}	0.5892_{21}	**274**
275	409.50_{33}	383.6	1206.8	823.2	737.9	85.3	0.5768	1.691_{6}	0.5913_{21}	**275**
276	409.83_{33}	384.0	1206.9	822.9	737.6	85.3	0.5772	1.685_{6}	0.5934_{21}	**276**
277	410.16_{32}	384.3	1207.0	822.7	737.4	85.3	0.5776	1.679_{6}	0.5955_{21}	**277**
278	410.48_{32}	384.6	1207.1	822.5	737.2	85.3	0.5779	1.673_{5}	0.5976_{21}	**278**
279	410.80_{32}	385.0	1207.2	822.2	736.9	85.3	0.5783	1.668_{6}	0.5997_{23}	**279**
280	411.12_{33}	385.3	1207.3	822.0	736.7	85.3	0.5787	1.662_{6}	0.602_{2}	**280**
281	411.44_{32}	385.6	1207.4	821.8	736.5	85.3	0.5791	1.656_{6}	0.604_{2}	**281**
282	411.76_{32}	386.0	1207.5	821.5	736.2	85.3	0.5795	1.650_{5}	0.606_{2}	**282**
283	412.08_{32}	386.3	1207.6	821.3	736.0	85.3	0.5799	1.645_{6}	0.608_{2}	**283**
284	412.40_{32}	386.6	1207.7	821.1	735.8	85.3	0.5803	1.639_{5}	0.610_{2}	**284**
285	412.72_{32}	387.0	1207.8	820.8	735.5	85.3	0.5806	1.634_{6}	0.612_{2}	**285**
286	413.04_{32}	387.3	1207.9	820.6	735.3	85.3	0.5810	1.628_{5}	0.614_{2}	**286**
287	413.36_{32}	387.7	1208.0	820.3	735.0	85.3	0.5814	1.623_{6}	0.616_{2}	**287**
288	413.68_{32}	388.0	1208.1	820.1	734.7	85.4	0.5818	1.617_{5}	0.618_{2}	**288**
289	414.00_{32}	388.3	1208.2	819.9	734.5	85.4	0.5822	1.612_{5}	0.620_{2}	**289**
290	414.32_{31}	388.6	1208.3	819.7	734.3	85.4	0.5826	1.607_{6}	0.622_{3}	**290**
291	414.63_{31}	389.0	1208.4	819.4	734.0	85.4	0.5829	1.601_{5}	0.625_{2}	**291**
292	414.94_{31}	389.3	1208.5	819.2	733.8	85.4	0.5833	1.596_{5}	0.627_{2}	**292**
293	415.25_{31}	389.6	1208.6	819.0	733.6	85.4	0.5837	1.591_{6}	0.629_{2}	**293**
294	415.56_{31}	390.0	1208.7	818.7	733.3	85.4	0.5840	1.585_{5}	0.631_{2}	**294**
295	415.87_{31}	390.3	1208.8	818.5	733.1	85.4	0.5844	1.580_{5}	0.633_{2}	**295**
296	416.18_{31}	390.6	1208.9	818.3	732.9	85.4	0.5848	1.575_{5}	0.635_{2}	**296**
297	416.49_{31}	390.9	1209.0	818.1	732.7	85.4	0.5851	1.570_{6}	0.637_{2}	**297**
298	416.80_{31}	391.3	1209.1	817.8	732.4	85.4	0.5855	1.564_{5}	0.639_{2}	**298**
299	417.11_{31}	391.6	1209.2	817.6	732.2	85.4	0.5859	1.559_{5}	0.641_{3}	**299**
300	417.42_{30}	391.9	1209.3	817.4	732.0	85.4	0.5863	1.554_{5}	0.644_{2}	**300**
301	417.72_{30}	392.2	1209.3	817.1	731.7	85.4	0.5866	1.549_{5}	0.646_{2}	**301**
302	418.02_{30}	392.5	1209.4	816.9	731.5	85.4	0.5870	1.544_{5}	0.648_{2}	**302**
303	418.32_{30}	392.8	1209.5	816.7	731.3	85.4	0.5873	1.539_{5}	0.650_{2}	**303**
304	418.62_{30}	393.2	1209.6	816.4	731.0	85.4	0.5877	1.534_{5}	0.652_{2}	**304**
305	418.92_{30}	393.5	1209.7	816.2	730.8	85.4	0.5880	1.529_{5}	0.654_{2}	**305**
306	419.22_{30}	393.8	1209.8	816.0	730.6	85.4	0.5884	1.524_{4}	0.656_{2}	**306**
307	419.52_{30}	394.1	1209.9	815.8	730.4	85.4	0.5888	1.520_{5}	0.658_{2}	**307**
308	419.82_{30}	394.4	1210.0	815.6	730.2	85.4	0.5891	1.515_{5}	0.660_{2}	**308**
309	420.12_{30}	394.7	1210.1	815.4	730.0	85.4	0.5895	1.510_{5}	0.662_{2}	**309**
310	420.42_{30}	395.0	1210.2	815.2	729.8	85.4	0.5898	1.505_{5}	0.664_{2}	**310**

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int\frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
314	421.62_{30}	396.3	1210.5	814.2	728.7	85.5	0.5913	1.486_{5}	0.673_{2}	**314**
315	421.92_{29}	396.6	1210.6	814.0	728.5	85.5	0.5916	1.481_{4}	0.675_{2}	**315**
316	422.21_{29}	396.9	1210.7	813.8	728.3	85.5	0.5919	1.477_{5}	0.677_{2}	**316**
317	422.50_{29}	397.2	1210.8	813.6	728.1	85.5	0.5923	1.472_{4}	0.679_{2}	**317**
318	422.79_{29}	397.5	1210.9	813.4	727.9	85.5	0.5926	1.468_{4}	0.681_{2}	**318**
319	423.08_{29}	397.8	1211.0	813.2	727.7	85.5	0.5930	1.464_{5}	0.683_{2}	**319**
320	423.37_{29}	398.1	1211.1	813.0	727.5	85.5	0.5933	1.459_{5}	0.685_{3}	**320**
321	423.66_{29}	398.4	1211.2	812.8	727.3	85.5	0.5937	1.454_{4}	0.688_{2}	**321**
322	423.95_{29}	398.7	1211.2	812.5	727.0	85.5	0.5940	1.450_{5}	0.690_{2}	**322**
323	424.24_{29}	399.0	1211.3	812.3	726.8	85.5	0.5944	1.445_{4}	0.692_{2}	**323**
324	424.53_{29}	399.3	1211.4	812.1	726.6	85.5	0.5947	1.441_{4}	0.694_{2}	**324**
325	424.82_{28}	399.6	1211.5	811.9	726.4	85.5	0.5950	1.437_{5}	0.696_{2}	**325**
326	425.10_{28}	399.9	1211.6	811.7	726.2	85.5	0.5954	1.432_{4}	0.698_{2}	**326**
327	425.38_{29}	400.2	1211.7	811.5	726.0	85.5	0.5957	1.428_{4}	0.700_{2}	**327**
328	425.67_{29}	400.5	1211.8	811.3	725.8	85.5	0.5960	1.424_{4}	0.702_{2}	**328**
329	425.96_{28}	400.8	1211.9	811.1	725.6	85.5	0.5964	1.420_{5}	0.704_{3}	**329**
330	426.24_{28}	401.1	1211.9	810.8	725.3	85.5	0.5967	1.415_{4}	0.707_{2}	**330**
331	426.52_{28}	401.4	1212.0	810.6	725.1	85.5	0.5970	1.411_{4}	0.709_{2}	**331**
332	426.80_{28}	401.7	1212.1	810.4	724.9	85.5	0.5974	1.407_{4}	0.711_{2}	**332**
333	427.08_{28}	402.0	1212.2	810.2	724.7	85.5	0.5977	1.403_{4}	0.713_{2}	**333**
334	427.36_{28}	402.3	1212.3	810.0	724.5	85.5	0.5980	1.399_{4}	0.715_{2}	**334**
335	427.64_{28}	402.6	1212.4	809.8	724.3	85.5	0.5984	1.395_{4}	0.717_{2}	**335**
336	427.92	402.9	1212.5	809.6	724.1	85.5	0.5987	1.391	0.719	**336**

TABLE III.

SATURATED STEAM.

FRENCH UNITS.

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	4.602_{339}	0.000	606.5	606.5	575.5	31.0	0.00000	211.5_{138}	0.004730_{327}	0
1	4.941_{362}	1.007	606.8	605.8	574.7	31.1	0.00367	197.7_{131}	0.005057_{360}	1
2	5.303_{386}	2.014	607.1	605.1	573.9	31.2	0.00733	184.6_{122}	0.005417_{383}	2
3	5.689_{411}	3.022	607.4	604.4	573.2	31.2	0.01098	172.4_{112}	0.005800_{403}	3
4	6.100_{430}	4.029	607.7	603.7	572.4	31.3	0.01461	161.2_{104}	0.006203_{427}	4
5	6.530_{465}	5.036	608.0	603.0	571.6	31.4	0.01823	150.8_{96}	0.006630_{450}	5
6	7.001_{493}	6.040	608.3	602.3	570.8	31.5	0.02183	141.2_{90}	0.007080_{481}	6
7	7.494_{525}	7.045	608.6	601.6	570.0	31.6	0.02542	132.2_{83}	0.007561_{508}	7
8	8.019_{557}	8.049	608.9	600.9	569.3	31.6	0.02899	123.9_{77}	0.008069_{529}	8
9	8.570_{591}	9.054	609.2	600.1	568.4	31.7	0.03255	116.2_{72}	0.008608_{569}	9
10	9.167_{628}	10.058	609.6	599.5	567.7	31.8	0.03609	109.0_{67}	0.009177_{602}	10
11	9.795_{665}	11.060	609.9	598.8	566.9	31.9	0.03962	102.3_{62}	0.009779_{631}	11
12	10.460_{704}	12.061	610.2	598.1	566.1	32.0	0.04313	96.09_{590}	0.01041_{67}	12
13	11.164_{747}	13.063	610.5	597.4	565.3	32.1	0.04663	90.19_{543}	0.01108_{71}	13
14	11.911_{791}	14.064	610.8	596.7	564.5	32.2	0.05012	84.76_{507}	0.01179_{76}	14
15	12.702_{837}	15.066	611.1	596.0	563.8	32.2	0.05359	79.69_{472}	0.01255_{79}	15
16	13.539_{884}	16.066	611.4	595.3	563.0	32.3	0.05705	74.97_{441}	0.01334_{83}	16
17	14.423_{937}	17.066	611.7	594.6	562.2	32.4	0.06050	70.56_{412}	0.01417_{88}	17
18	15.360_{989}	18.066	612.0	593.9	561.4	32.5	0.06330	66.44_{386}	0.01505_{93}	18
19	16.349_{1046}	19.066	612.3	593.2	560.6	32.6	0.06735	62.58_{360}	0.01598_{97}	19
20	17.395_{1103}	20.066	612.6	592.5	559.8	32.7	0.07076	58.98_{337}	0.01695_{103}	20
21	18.498_{1165}	21.064	612.9	591.8	559.0	32.8	0.07415	55.61_{315}	0.01798_{108}	21
22	19.663_{1229}	22.063	613.2	591.1	558.2	32.9	0.07754	52.46_{295}	0.01906_{114}	22
23	20.892_{1296}	23.061	613.5	590.4	557.5	32.9	0.08091	49.51_{277}	0.02020_{119}	23
24	22.188_{1366}	24.059	613.8	589.7	556.7	33.0	0.08427	46.74_{259}	0.02139_{126}	24
25	23.554_{1440}	25.058	614.1	589.0	555.9	33.1	0.08762	44.15_{243}	0.02265_{132}	25
26	24.994_{1516}	26.053	614.4	588.3	555.1	33.2	0.09094	41.72_{227}	0.02397_{138}	26
27	26.510_{1597}	27.048	614.7	587.7	554.4	33.3	0.09426	39.45_{214}	0.02535_{145}	27
28	28.107_{1679}	28.042	615.0	587.0	553.6	33.4	0.09756	37.31_{201}	0.02680_{153}	28
29	29.786_{1767}	29.037	615.3	586.3	552.8	33.5	0.10085	35.30_{188}	0.02833_{159}	29
30	31.553_{1858}	30.032	615.7	585.7	552.1	33.6	0.10413	33.42_{177}	0.02992_{168}	30

Temperature, Degrees Centigrade.	Pressure, Millimeters of Mercury.	Heat of the Liquid.	Total Heat.	Heat of Vaporization.	Heat equivalent of Internal Work.	Heat equivalent of External Work.	Entropy of the Liquid.	Specific Volume.	DENSITY. Weight, in Kilos, of one Cubic Meter.	Temperature, Degrees Centigrade.
t	p	q	λ	r	ρ	Apu	$\int \frac{cdt}{T}$	s	γ	t
31	33.411_{1953}	31.027	616.0	585.0	551.3	33.7	0.10740	31.65_{167}	0.03160_{175}	**31**
32	35.364_{2052}	32.023	616.3	584.3	550.5	33.8	0.11067	29.98_{156}	0.03335_{184}	**32**
33	37.416_{2155}	33.018	616.6	583.6	549.7	33.9	0.11392	28.42_{148}	0.03519_{193}	**33**
34	39.571_{2262}	34.014	616.9	582.9	548.9	34.0	0.11716	26.94_{138}	0.03712_{201}	**34**
35	41.833_{2374}	35.009	617.2	582.2	548.2	34.0	0.12039	25.56_{131}	0.03913_{211}	**35**
36	44.207_{2490}	36.007	617.5	581.5	547.4	34.1	0.12362	24.25_{123}	0.04124_{220}	**36**
37	46.697_{2611}	37.005	617.8	580.8	546.6	34.2	0.12683	23.02_{116}	0.04344_{230}	**37**
38	49.308_{2742}	38.004	618.1	580.1	545.8	34.3	0.13004	21.86_{109}	0.04574_{241}	**38**
39	52.05_{286}	39.002	618.4	579.4	545.0	34.4	0.13324	20.77_{103}	0.04815_{251}	**39**
40	54.91_{301}	40.0	618.7	578.7	544.2	34.5	0.1364	19.74_{98}	0.05066_{263}	**40**
41	57.92_{314}	41.0	619.0	578.0	543.4	34.6	0.1396	18.76_{92}	0.05329_{275}	**41**
42	61.06_{329}	42.0	619.3	577.3	542.6	34.7	0.1428	17.84_{86}	0.05604_{285}	**42**
43	64.35_{345}	43.0	619.6	576.6	541.8	34.8	0.1459	16.98_{82}	0.05889_{298}	**43**
44	67.80_{360}	44.0	619.9	575.9	541.0	34.9	0.1491	16.16_{77}	0.06187_{310}	**44**
45	71.40_{370}	45.0	620.2	575.2	540.2	35.0	0.1522	15.39_{73}	0.06497_{325}	**45**
46	75.10_{394}	46.0	620.5	574.5	539.4	35.1	0.1554	14.66_{69}	0.06822_{338}	**46**
47	79.10_{411}	47.0	620.8	573.8	538.6	35.2	0.1585	13.97_{66}	0.07160_{352}	**47**
48	83.21_{430}	48.0	621.1	573.1	537.8	35.3	0.1617	13.31_{62}	0.07512_{366}	**48**
49	87.51_{447}	49.0	621.4	572.4	537.0	35.4	0.1648	12.69_{58}	0.07878_{381}	**49**
50	91.98_{467}	50.0	621.8	571.8	536.3	35.5	0.1679	12.11_{55}	0.08259_{394}	**50**
51	96.65_{489}	51.0	622.1	571.1	535.5	35.6	0.1710	11.56_{53}	0.08653_{416}	**51**
52	101.54_{510}	52.1	622.4	570.3	534.6	35.7	0.1741	11.03_{50}	0.09069_{428}	**52**
53	106.64_{531}	53.1	622.7	569.6	533.8	35.8	0.1772	10.53_{47}	0.09497_{443}	**53**
54	111.95_{554}	54.1	623.0	568.9	533.0	35.9	0.1803	10.06_{45}	0.09940_{470}	**54**
55	117.49_{576}	55.1	623.3	568.2	532.2	36.0	0.1833	9.610_{425}	0.1041_{48}	**55**
56	123.25_{601}	56.1	623.6	567.5	531.4	36.1	0.1864	9.185_{403}	0.1089_{50}	**56**
57	129.26_{625}	57.1	623.9	566.8	530.7	36.1	0.1895	8.782_{383}	0.1139_{52}	**57**
58	135.51_{651}	58.1	624.2	566.1	529.9	36.2	0.1925	8.399_{363}	0.1191_{54}	**58**
59	142.02_{678}	59.1	624.5	565.4	529.1	36.3	0.1956	8.036_{349}	0.1245_{56}	**59**
60	148.80_{705}	60.1	624.8	564.7	528.3	36.4	0.1986	7.687_{325}	0.1301_{57}	**60**
61	155.85_{733}	61.1	625.1	564.0	527.5	36.5	0.2016	7.362_{311}	0.1358_{60}	**61**
62	163.18_{762}	62.1	625.4	563.3	526.7	36.6	0.2046	7.051_{297}	0.1418_{63}	**62**
63	170.80_{792}	63.1	625.7	562.6	525.9	36.7	0.2076	6.754_{284}	0.1481_{65}	**63**
64	178.72_{823}	64.2	626.0	561.8	525.0	36.8	0.2106	6.470_{269}	0.1546_{67}	**64**
65	186.95_{855}	65.2	626.3	561.1	524.2	36.9	0.2136	6.201_{254}	0.1613_{69}	**65**
66	195.50_{888}	66.2	626.6	560.4	523.4	37.0	0.2166	5.947_{242}	0.1682_{71}	**66**
67	204.38_{922}	67.2	626.9	559.7	522.6	37.1	0.2196	5.705_{233}	0.1753_{74}	**67**
68	213.60_{957}	68.2	627.2	559.0	521.8	37.2	0.2225	5.472_{222}	0.1827_{78}	**68**
69	223.17	69.2	627.5	558.3	521.0	37.3	0.2254	5.250	0.1905	**69**

Temperature, Degrees Centigrade.	Pressure, Millimeters of Mercury.	Heat of the Liquid.	Total Heat.	Heat of Vaporization.	Heat equivalent of Internal Work.	Heat equivalent of External Work.	Entropy of the Liquid.	Specific Volume.	DENSITY. Weight, in Kilos, of one Cubic Meter.	Temperature, Degrees Centigrade.
t	p	q	λ	r	ρ	Apu	$\int\frac{cdt}{T}$	s	γ	t
71	243.39_{1068}	71.2	628.2	557.0	519.5	37.5	0.2313	4.839_{191}	0.2067_{84}	**71**
72	254.07_{1107}	72.2	628.5	556.3	518.7	37.6	0.2342	4.648_{183}	0.2151_{88}	**72**
73	265.14_{1148}	73.2	628.8	555.6	517.9	37.7	0.2371	4.465_{174}	0.2239_{91}	**73**
74	276.62_{1189}	74.2	629.1	554.9	517.1	37.8	0.2400	4.291_{167}	0.2330_{95}	**74**
75	288.51_{1232}	75.2	629.4	554.2	516.3	37.9	0.2429	4.124_{159}	0.2425_{97}	**75**
76	300.83_{1276}	76.2	629.7	553.5	515.5	38.0	0.2458	3.965_{152}	0.2522_{101}	**76**
77	313.59_{1321}	77.3	630.0	552.7	514.6	38.1	0.2487	3.813_{145}	0.2623_{103}	**77**
78	326.80_{1368}	78.3	630.3	552.0	513.8	38.2	0.2516	3.668_{139}	0.2726_{107}	**78**
79	340.48_{1415}	79.3	630.6	551.3	513.0	38.3	0.2544	3.529_{132}	0.2833_{111}	**79**
80	354.63_{1464}	80.3	630.9	550.6	512.3	38.3	0.2573	3.397_{127}	0.2944_{114}	**80**
81	369.27_{1514}	81.3	631.2	549.9	511.5	38.4	0.2601	3.270_{121}	0.3058_{118}	**81**
82	384.41_{1567}	82.3	631.5	549.2	510.7	38.5	0.2630	3.149_{116}	0.3176_{122}	**82**
83	400.08_{1619}	83.3	631.8	548.5	509.9	38.6	0.2658	3.033_{111}	0.3298_{125}	**83**
84	416.27_{1674}	84.3	632.1	547.8	509.1	38.7	0.2686	2.922_{107}	0.3423_{129}	**84**
85	433.01_{1730}	85.3	632.4	547.1	508.3	38.8	0.2714	2.815_{101}	0.3552_{133}	**85**
86	450.31_{1787}	86.3	632.7	546.4	507.5	38.9	0.2742	2.714_{98}	0.3685_{137}	**86**
87	468.18_{1846}	87.3	633.0	545.7	506.7	39.0	0.2770	2.616_{93}	0.3822_{143}	**87**
88	486.64_{1907}	88.3	633.3	545.0	505.9	39.1	0.2798	2.523_{90}	0.3965_{146}	**88**
89	505.71_{1969}	89.4	633.6	544.2	505.0	39.2	0.2826	2.433_{86}	0.4111_{149}	**89**
90	525.40_{2032}	90.4	634.0	543.6	504.3	39.3	0.2854	2.347_{82}	0.4260_{155}	**90**
91	545.72_{2098}	91.4	634.3	542.9	503.6	39.3	0.2881	2.265_{79}	0.4415_{160}	**91**
92	566.70_{2164}	92.4	634.6	542.2	502.8	39.4	0.2909	2.186_{76}	0.4575_{164}	**92**
93	588.34_{2233}	93.4	634.9	541.5	502.0	39.5	0.2937	2.110_{72}	0.4739_{169}	**93**
94	610.67_{2303}	94.4	635.2	540.8	501.2	39.6	0.2964	2.038_{70}	0.4908_{173}	**94**
95	633.70_{2375}	95.4	635.5	540.1	500.4	39.7	0.2991	1.968_{67}	0.5081_{180}	**95**
96	657.45_{2448}	96.4	635.8	539.4	499.6	39.8	0.3019	1.901_{65}	0.5261_{184}	**96**
97	681.93_{2524}	97.4	636.1	538.7	498.8	39.9	0.3046	1.836_{62}	0.5445_{191}	**97**
98	707.17_{2602}	98.4	636.4	538.0	498.1	39.9	0.3073	1.774_{59}	0.5636_{195}	**98**
99	733.19_{2681}	99.4	636.7	537.3	497.3	40.0	0.3100	1.715_{54}	0.5831_{193}	**99**
100	760.00_{275}	100.4	637.0	536.6	496.4	40.2	0.3127	1.661_{52}	0.6024_{195}	**100**
101	787.5_{283}	101.4	637.3	535.9	495.6	40.3	0.3154	1.609_{53}	0.6219_{208}	**101**
102	815.8_{292}	102.5	637.6	535.1	494.7	40.4	0.3181	1.556_{51}	0.6427_{218}	**102**
103	845.0_{301}	103.5	637.9	534.4	493.9	40.5	0.3208	1.505_{49}	0.6645_{223}	**103**
104	875.1_{309}	104.5	638.2	533.7	493.2	40.5	0.3235	1.456_{47}	0.6868_{229}	**104**
105	906.0_{319}	105.5	638.5	533.0	492.4	40.6	0.3261	1.409_{47}	0.7097_{236}	**105**
106	937.9_{328}	106.5	638.8	532.3	491.6	40.7	0.3288	1.365_{45}	0.7333_{243}	**106**
107	970.7_{337}	107.5	639.1	531.6	490.8	40.8	0.3314	1.320_{42}	0.7576_{249}	**107**
108	1004.4_{347}	108.5	639.4	530.9	490.1	40.8	0.3341	1.278_{40}	0.7825_{255}	**108**
109	1039.1	109.5	639.7	530.2	489.3	40.9	0.3367	1.238	0.8080	**109**

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Diff.	Heat of the Liquid q	Total Heat. λ	Heat of Vaporization r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{dt}{T}$	Specific Volume s	Diff.	DENSITY. Weight, in Kilos, of one Cubic Meter. γ	Diff.	Temperature, Degrees Centigrade. t
111	1111.4	377	111.5	640.4	528.9	487.8	41.1	0.3420	1.162	36	0.8608	275	**111**
112	1149.1	388	112.5	640.7	528.2	487.0	41.2	0.3446	1.126	35	0.8883	283	**112**
113	1187.9	398	113.5	641.0	527.5	486.3	41.2	0.3471	1.091	34	0.9166	290	**113**
114	1227.7	410	114.6	641.3	526.7	485.4	41.3	0.3498	1.057	32	0.9456	299	**114**
115	1268.7	420	115.6	641.6	526.0	484.6	41.4	0.3524	1.025	31	0.9755	305	**115**
116	1310.7	432	116.6	641.9	525.3	483.8	41.5	0.3550	0.9942	299	1.006	31	**116**
117	1353.9	444	117.6	642.2	524.6	483.1	41.5	0.3576	0.9643	289	1.037	32	**117**
118	1398.3	455	118.6	642.5	523.9	482.3	41.6	0.3601	0.9354	278	1.069	33	**118**
119	1443.8	467	119.6	642.8	523.2	481.5	41.7	0.3627	0.9076	268	1.102	33	**119**
120	1490.5	480	120.6	643.1	522.5	480.7	41.8	0.3653	0.8808	258	1.135	35	**120**
121	1538.5	492	121.6	643.4	521.8	480.0	41.8	0.3678	0.8550	250	1.170	35	**121**
122	1587.7	506	122.6	643.7	521.1	479.2	41.9	0.3704	0.8300	241	1.205	36	**122**
123	1638.3	518	123.6	644.0	520.4	478.4	42.0	0.3729	0.8059	233	1.241	37	**123**
124	1690.1	532	124.6	644.3	519.7	477.6	42.1	0.3755	0.7826	224	1.278	37	**124**
125	1743.3	545	125.6	644.6	519.0	476.8	42.2	0.3780	0.7602	216	1.315	39	**125**
126	1797.8	559	126.6	644.9	518.3	476.1	42.2	0.3805	0.7386	211	1.354	40	**126**
127	1853.7	573	127.7	645.2	517.5	475.2	42.3	0.3830	0.7175	202	1.394	40	**127**
128	1911.0	587	128.7	645.5	516.8	474.4	42.4	0.3856	0.6973	195	1.434	41	**128**
129	1969.7	601	129.7	645.8	516.1	473.6	42.5	0.3881	0.6778	187	1.475	42	**129**
130	2029.8	617	130.7	646.2	515.5	473.0	42.5	0.3906	0.6591	183	1.517	43	**130**
131	2091.5	633	131.7	646.5	514.8	472.2	42.6	0.3931	0.6408	177	1.560	45	**131**
132	2154.8	647	132.7	646.8	514.1	471.4	42.7	0.3955	0.6231	170	1.605	45	**132**
133	2219.5	663	133.7	647.1	513.4	470.6	42.8	0.3980	0.6061	165	1.650	46	**133**
134	2285.8	679	134.7	647.4	512.7	469.8	42.9	0.4005	0.5896	160	1.696	47	**134**
135	2353.7	695	135.7	647.7	512.0	469.1	42.9	0.4030	0.5736	153	1.743	48	**135**
136	2423.2	712	136.7	648.0	511.3	468.3	43.0	0.4054	0.5583	149	1.791	49	**136**
137	2494.4	728	137.7	648.3	510.6	467.5	43.1	0.4079	0.5434	145	1.840	51	**137**
138	2567.2	745	138.7	648.6	509.9	466.7	43.2	0.4103	0.5289	140	1.891	51	**138**
139	2641.7	762	139.8	648.9	509.1	465.9	43.2	0.4128	0.5149	136	1.942	53	**139**
140	2717.9	780	140.8	649.2	508.4	465.1	43.3	0.4152	0.5013	130	1.995	53	**140**
141	2795.9	798	141.8	649.5	507.7	464.3	43.4	0.4177	0.4883	127	2.048	55	**141**
142	2875.7	816	142.8	649.8	507.0	463.5	43.5	0.4201	0.4756	123	2.103	55	**142**
143	2957.3	835	143.8	650.1	506.3	462.8	43.5	0.4225	0.4633	119	2.158	57	**143**
144	3040.8	853	144.8	650.4	505.6	462.0	43.6	0.4249	0.4514	115	2.215	58	**144**
145	3126.1	872	145.8	650.7	504.9	461.2	43.7	0.4273	0.4399	112	2.273	59	**145**
146	3213.3	892	146.8	651.0	504.2	460.4	43.8	0.4297	0.4287	108	2.332	60	**146**
147	3302.5	911	147.8	651.3	503.5	459.6	43.9	0.4321	0.4179	105	2.392	62	**147**
148	3393.6	931	148.8	651.6	502.8	458.9	43.9	0.4345	0.4074	101	2.454	63	**148**

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p		Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int\frac{cdt}{T}$	Specific Volume. s		DENSITY. Weight, in Kilos, of one Cubic Meter. γ		Temperature, Degrees Centigrade. t
151	3679.1	993	151.8	652.6	500.8	456.6	44.2	0.4417	0.3779	93	2.646	67	**151**
152	3778.4	1014	152.9	652.9	500.0	455.8	44.2	0.4440	0.3686	90	2.713	68	**152**
153	3879.8	1035	153.9	653.2	499.3	455.0	44.3	0.4464	0.3596	87	2.781	69	**153**
154	3983.3	1057	154.9	653.5	498.6	454.2	44.4	0.4488	0.3509	85	2.850	70	**154**
155	4089.0	1079	155.9	653.8	497.9	453.4	44.5	0.4511	0.3424	82	2.920	72	**155**
156	4196.9	1102	156.9	654.1	497.2	452.7	44.5	0.4536	0.3342	80	2.992	74	**156**
157	4307.1	1124	158.0	654.4	496.4	451.8	44.6	0.4560	0.3262	78	3.066	75	**157**
158	4419.5	1148	159.0	654.7	495.7	450.0	44.7	0.4584	0.3184	76	3.141	76	**158**
159	4534.3	1171	160.1	655.0	494.9	449.2	44.7	0.4608	0.3108	73	3.217	78	**159**
160	4651.4	1195	161.1	655.3	494.2	449.4	44.8	0.4633	0.3035	71	3.295	79	**160**
161	4770.9	1218	162.2	655.6	493.4	448.5	44.9	0.4657	0.2964	69	3.374	80	**161**
162	4892.7	1243	163.2	655.9	492.7	447.7	45.0	0.4681	0.2895	67	3.454	82	**162**
163	5017.	127	164.2	656.2	492.0	447.0	45.0	0.4705	0.2828	66	3.536	84	**163**
164	5144.	129	165.3	656.5	491.2	446.1	45.1	0.4729	0.2762	63	3.620	85	**164**
165	5273.	132	166.3	656.8	490.5	445.3	45.2	0.4752	0.2699	62	3.705	87	**165**
166	5405.	134	167.4	657.1	489.7	444.5	45.2	0.4776	0.2637	60	3.792	88	**166**
167	5539.	137	168.4	657.4	489.0	443.7	45.3	0.4800	0.2577	58	3.880	90	**167**
168	5676.	140	169.5	657.7	488.2	442.9	45.3	0.4824	0.2519	57	3.970	91	**168**
169	5816.	143	170.5	658.0	487.5	442.1	45.4	0.4847	0.2462	55	4.061	93	**169**
170	5959.	145	171.6	658.4	486.8	441.3	45.5	0.4871	0.2407	53	4.154	94	**170**
171	6104.	147	172.6	658.7	486.1	440.5	45.6	0.4895	0.2354	52	4.248	97	**171**
172	6251.	151	173.7	659.0	485.3	439.7	45.6	0.4918	0.2302	51	4.345	99	**172**
173	6402.	153	174.7	659.3	484.6	438.9	45.7	0.4941	0.2251	50	4.444	99	**173**
174	6555.	157	175.8	659.6	483.8	438.1	45.7	0.4965	0.2201	48	4.543	101	**174**
175	6712.	159	176.8	659.9	483.1	437.3	45.8	0.4988	0.2153	47	4.644	103	**175**
176	6871.	162	177.8	660.2	482.4	436.5	45.9	0.5011	0.2106	45	4.747	105	**176**
177	7033.	165	178.9	660.5	481.6	435.7	45.9	0.5035	0.2061	44	4.852	107	**177**
178	7198.	168	179.9	660.8	480.9	434.9	46.0	0.5058	0.2017	44	4.959	109	**178**
179	7366.	171	181.0	661.1	480.1	434.0	46.1	0.5081	0.1973	42	5.068	110	**179**
180	7537.	175	182.0	661.4	479.4	433.3	46.1	0.5104	0.1931	41	5.178	113	**180**
181	7712.	177	183.1	661.7	478.6	432.4	46.2	0.5127	0.1890	40	5.291	114	**181**
182	7889.	181	184.1	662.0	477.9	431.7	46.2	0.5150	0.1850	39	5.405	117	**182**
183	8070.	183	185.2	662.3	477.1	430.8	46.3	0.5173	0.1811	38	5.522	118	**183**
184	8253.	187	186.2	662.6	476.4	430.1	46.3	0.5196	0.1773	37	5.640	120	**184**
185	8440.	191	187.3	662.9	475.6	429.2	46.4	0.5219	0.1736	36	5.760	122	**185**
186	8631.	193	188.3	663.2	474.9	428.5	46.4	0.5242	0.1700	36	5.882	125	**186**
187	8824.	197	189.4	663.5	474.1	427.6	46.5	0.5264	0.1664	34	6.007	127	**187**
188	9021.	201	190.4	663.8	473.4	426.9	46.5	0.5287	0.1630	33	6.134	128	**188**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.5310	0.1597	[illegible]	6.262	[illegible]	**189**

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p		Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s		Density. Weight, in Kilos, of one Cubic Meter. γ		Temperature, Degrees Centigrade. t
191	9633.	211	193.5	664.8	471.3	424.6	46.7	0.5355	0.1532	31	6.525	136	191
192	9844.	214	194.6	665.1	470.5	423.7	46.8	0.5377	0.1501	30	6.661	137	192
193	10058.	218	195.6	665.4	469.8	423.0	46.8	0.5400	0.1471	30	6.798	140	193
194	10276.	222	196.7	665.7	469.0	422.2	46.8	0.5422	0.1441	29	6.938	142	194
195	10498.	226	197.7	666.0	468.3	421.4	46.9	0.5444	0.1412	28	7.080	145	195
196	10724.	229	198.8	666.3	467.5	420.6	46.9	0.5467	0.1384	27	7.225	147	196
197	10953.	233	199.8	666.6	466.8	419.8	47.0	0.5489	0.1357	27	7.372	149	197
198	11186.	238	200.9	666.9	466.0	419.0	47.0	0.5511	0.1330	27	7.521	151	198
199	11424.	240	201.9	667.2	465.3	418.2	47.1	0.5533	0.1303	26	7.672	155	199
200	11664.	245	203.0	667.5	464.5	417.4	47.1	0.5555	0.1277	25	7.827	157	200
201	11909.	249	204.0	667.8	463.8	416.7	47.1	0.5577	0.1252	24	7.984	159	201
202	12158.	253	205.0	668.1	463.1	415.9	47.2	0.5599	0.1228	24	8.143	162	202
203	12411.	257	206.1	668.4	462.3	415.1	47.2	0.5621	0.1204	23	8.305	165	203
204	12668.	262	207.1	668.7	461.6	414.4	47.2	0.5643	0.1181	23	8.470	169	204
205	12930.	265	208.2	669.0	460.8	413.5	47.3	0.5665	0.1158	23	8.639	171	205
206	13195.	270	209.2	669.3	460.1	412.8	47.3	0.5687	0.1135	22	8.810	174	206
207	13465.	274	210.3	669.6	459.3	412.0	47.3	0.5709	0.1113	21	8.984	176	207
208	13739.	279	211.3	669.9	458.6	411.3	47.3	0.5731	0.1092	21	9.160	178	208
209	14018.	283	212.4	670.2	457.8	410.4	47.4	0.5752	0.1071	21	9.338	181	209
210	14301.	287	213.4	670.6	457.2	409.8	47.4	0.5774	0.1050	20	9.519	185	210
211	14588.	292	214.5	670.9	456.4	409.0	47.4	0.5795	0.1030	19	9.704	190	211
212	14880.	297	215.5	671.2	455.7	408.3	47.4	0.5817	0.1011	19	9.894	186	212
213	15177.	301	216.5	671.5	455.0	407.6	47.4	0.5839	0.0992	19	10.08	20	213
214	15478.	307	217.6	671.8	454.2	406.7	47.5	0.5860	0.0973	19	10.28	20	214
215	15785.	311	218.6	672.1	453.5	406.0	47.5	0.5881	0.0954	18	10.48	20	215
216	16096.	315	219.7	672.4	452.7	405.2	47.5	0.5903	0.0936	18	10.68	21	216
217	16411.	321	220.7	672.7	452.0	404.5	47.5	0.5924	0.0918	17	10.89	21	217
218	16732.	326	221.8	673.0	451.2	403.7	47.5	0.5945	0.0901	17	11.10	21	218
219	17058.	331	222.8	673.3	450.5	403.0	47.5	0.5967	0.0884	16	11.31	22	219
220	17389.		223.9	673.6	449.7	402.2	47.5	0.5988	0.0868		11.53		220

TABLE IV.

SATURATED VAPOR OF ETHER.

FRENCH UNITS.

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	184.39	0.00	94.00	94.00	86.45	7.55	0.0000	1.278	0.782	0
10	286.83	5.32	98.44	93.12	85.37	7.75	0.01909	0.8440	1.185	10
20	432.78	10.70	102.78	92.08	84.13	7.95	0.03772	0.5741	1.742	20
30	634.80	16.14	107.00	90.86	82.72	8.14	0.05593	0.4013	2.492	30
40	907.04	21.63	111.11	89.48	81.15	8.33	0.07374	0.2877	3.746	40
50	1264.8	27.19	115.11	87.92	79.41	8.51	0.09117	0.2108	4.744	50
60	1725.0	32.80	119.00	86.20	77.53	8.67	0.1083	0.1580	6.329	60
70	2304.9	38.48	122.78	84.30	75.49	8.81	0.1250	0.1203	8.313	70
80	3022.8	44.21	126.44	82.23	73.32	8.91	0.1415	0.0932	10.73	80
90	3898.3	50.00	130.00	80.00	71.03	8.97	0.1576	0.0731	13.68	90
100	4953.3	55.86	133.44	77.58	68.62	8.96	0.1735	0.0577	17.33	100
110	6214.6	61.77	136.78	75.01	66.13	8.88	0.1891	0.0459	21.79	110
120	7719.2	67.74	140.00	72.26	63.57	8.69	0.2045	0.0364	27.47	120

Table V.

SATURATED VAPOR OF ALCOHOL.

FRENCH UNITS.

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	12.70	0.00	236.5	236.50	223.38	13.12	0.0000	32.21	0.03105	**0**
10	24.23	5.59	244.4	238.81	225.29	13.52	0.01996	17.39	0.05750	**10**
20	44.46	11.42	252.0	240.58	226.56	14.02	0.04003	9.847	0.1016	**20**
30	78.52	17.49	258.0	240.51	226.03	14.48	0.06029	5.753	0.1738	**30**
40	133.69	23.71	262.0	238.29	223.44	14.85	0.08073	3.465	0.2886	**40**
50	219.90	30.21	264.0	233.79	218.59	15.10	0.1014	2.143	0.4666	**50**
60	350.21	37.37	265.0	227.63	212.38	15.25	0.1223	1.359	0.7358	**60**
70	541.15	44.58	265.2	220.62	205.28	15.34	0.1435	0.8855	1.129	**70**
80	812.91	52.11	265.2	213.09	197.69	15.40	0.1650	0.5921	1.689	**80**
90	1189.3	59.07	266.0	206.03	190.54	15.49	0.1868	0.4073	2.455	**90**
100	1697.6	68.18	267.3	199.12	183.54	15.58	0.2090	0.2874	3.479	**100**
110	2367.6	76.74	269.6	192.86	177.15	15.71	0.2315	0.2083	4.801	**110**
120	3231.7	85.67	272.5	186.83	170.97	15.86	0.2544	0.1544	6.477	**120**
130	4328.0	94.98	276.0	181.02	164.99	16.03	0.2776	0.1170	8.547	**130**
140	5674.6	104.70	280.5	175.80	159.55	16.25	0.3013	0.0905	11.05	**140**
150	7318.4	114.82	285.3	170.48	154.03	16.45	0.3254	0.0714	14.01	**150**

TABLE VI.

SATURATED VAPOR OF CHLOROFORM.

FRENCH UNITS.

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	DENSITY. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	50.72	0.00	67.00	67.00	62.45	4.55	0.00000	2.377	0.4207	0
10	100.47	2.33	68.38	66.04	61.29	4.75	0.00836	1.475	0.6780	10
20	160.47	4.67	69.75	65.08	60.14	4.94	0.01646	0.9601	1.042	20
30	247.51	7.02	71.12	64.10	59.00	5.10	0.02432	0.6437	1.554	30
40	369.26	9.37	72.50	63.13	57.87	5.26	0.03196	0.4449	2.248	40
50	535.05	11.74	73.87	62.13	56.73	5.40	0.03940	0.3155	3.170	50
60	755.44	14.12	75.25	61.13	55.60	5.53	0.04664	0.2291	4.356	60
70	1042.1	16.51	76.62	60.11	54.45	5.66	0.05369	0.1700	5.88	70
80	1407.6	18.91	78.00	59.09	53.31	5.78	0.06057	0.1286	7.78	80
90	1865.2	21.32	79.37	58.05	52.16	5.89	0.06729	0.0991	10.09	90
100	2428.5	23.74	80.75	57.01	51.01	6.00	0.07386	0.0777	12.87	100
110	3111.0	26.17	82.12	55.95	49.84	6.11	0.08027	0.0618	16.18	110
120	3925.7	28.61	83.50	54.89	48.67	6.22	0.08655	0.0500	20.00	120
130	4885.1	31.06	84.87	53.81	47.48	6.33	0.09270	0.0410	24.39	130
140	6000.2	33.52	86.25	52.73	46.30	6.43	0.09872	0.0340	29.4	140
150	7280.6	35.99	87.62	51.63	45.10	6.53	0.10462	0.0286	35.0	150
160	8734.2	38.47	89.00	50.53	43.90	6.63	0.11041	0.0243	41.2	160

TABLE VII.

SATURATED VAPOR OF CARBON BISULPHIDE.

FRENCH UNITS.

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int c\frac{dt}{T}$	Specific Volume. s	Density. Weight in Kilos. of One Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	127.91	0.00	90.00	90.00	82.76	7.24	0,00000	1.766	0.5662	0
10	198.46	2.36	91.42	89.06	81.58	7.48	0,00847	1.177	0.8496	10
20	298.03	4.74	92.76	88.02	80.31	7.71	0,01670	0.8071	1.239	20
30	434.62	7.13	94.01	86.88	78.97	7.91	0,02472	0.5684	1.759	30
40	617.53	9.54	95.18	85.64	77.54	8.10	0,03252	0.4098	2.440	40
50	857.07	11.96	96.27	84.31	76.04	8.27	0,04013	0.3017	3.315	50
60	1164.5	14.41	97.28	82.87	74.45	8.42	0,04756	0.2261	4.417	60
70	1552.1	16.86	98.20	81.34	72.78	8.56	0,05482	0.1726	5.791	70
80	2032.5	19.34	99.04	79.70	71.03	8.67	0,06192	0.1338	7.473	80
90	2619.1	21.83	99.80	77.97	69.20	8.77	0,06886	0.1052	9.51	90
100	3325.2	24.34	100.48	76.14	67.29	8.85	0,07566	0.0837	11.95	100
110	4164.1	26.86	101.07	74.21	65.31	8.90	0,08233	0.0674	14.84	110
120	5148.8	29.40	101.58	72.18	63.24	8.94	0,08886	0.0549	18.21	120
130	6291.6	31.96	102.01	70.05	61.09	8.96	0,09527	0.0452	22.12	130
140	7604.0	34.53	102.36	67.83	58.88	8.95	0,10157	0.0375	26.7	140
150	9095.9	37.12	102.62	65.50	56.58	8.92	0,10775	0.0314	31.8	150

TABLE VIII.

SATURATED VAPOR OF CARBON TETRACHLORIDE.

FRENCH UNITS.

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	32.95	0.00	52.00	52.00	48.54	3.46	0.00000	3.272	0.3056	0
10	55.97	1.99	53.44	51.45	47.85	3.60	0.00714	2.005	0.4987	10
20	90.99	3.99	54.86	50.87	47.13	3.74	0.01409	1.283	0.7794	20
30	142.27	6.02	56.23	50.21	46.33	3.88	0.02087	0.8510	1.175	30
40	214.81	8.06	57.58	49.52	45.51	4.01	0.02749	0.5831	1.715	40
50	314.38	10.12	58.88	48.76	44.62	4.14	0.03396	0.4109	2.434	50
60	447.43	12.20	60.16	47.96	43.69	4.25	0.04028	0.2969	3.368	60
70	621.15	14.30	61.40	47.10	42.75	4.35	0.04648	0.2192	4.562	70
80	843.29	16.42	62.60	46.18	41.74	4.44	0.04255	0.1650	6.061	80
90	1122.3	18.55	63.77	45.22	40.50	4.72	0.05849	0.1263	7.92	90
100	1467.1	20.70	64.90	44.20	39.62	4.58	0.06433	0.0980	10.20	100
110	1887.4	22.87	66.01	43.14	38.52	4.62	0.07006	0.0770	12.99	110
120	2393.7	25.06	67.07	42.01	37.36	4.65	0.07569	0.0611	16.37	120
130	2996.0	27.27	68.10	40.83	36.18	4.65	0.08122	0.0490	20.41	130
140	3709.0	29.49	69.10	39.61	34.95	4.63	0.08666	0.0395	25.3	140
150	4543.1	31.73	70.07	38.34	33.75	4.59	0.09201	0.0321	31.2	150
160	5513.1	34.00	71.00	37.00	32.47	4.53	0.09720	0.0262	38.2	160

TABLE IX.

SATURATED VAPOR OF ACETON.

FRENCH UNITS.

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{dq}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	63.33	0.00	140.50	140.50	131.82	8.68	0.00000	4.275	0.2339	0
10	110.32	5.10	144.11	139.01	129.51	9.50	0.01832	2.680	0.3723	10
20	180.08	10.29	147.62	137.33	127.16	10.17	0.03627	1.758	0.5688	20
30	280.05	15.55	151.03	135.48	124.83	10.65	0.05389	1.187	0.8425	30
40	419.35	20.89	154.33	133.44	121.39	11.05	0.07119	0.8227	1.215	40
50	608.81	26.31	157.53	131.22	119.86	11.36	0.08820	0.5830	1.715	50
60	860.06	31.81	160.63	128.82	117.22	11.60	0.1049	0.4215	2.372	60
70	1180.9	37.39	163.62	126.23	114.43	11.80	0.1214	0.3106	3.220	70
80	1611.1	43.05	166.51	123.46	111.49	11.97	0.1376	0.2328	4.296	80
90	2140.8	48.79	169.30	120.51	108.41	12.10	0.1536	0.1773	5.640	90
100	2706.2	54.61	171.98	117.37	105.17	12.20	0.1694	0.1372	7.289	100
110	3594.3	60.50	174.56	114.06	101.78	12.28	0.1850	0.1076	9.294	110
120	4552.0	66.48	177.04	110.56	98.23	12.33	0.2004	0.0856	11.68	120
130	5684.0	72.54	179.42	106.88	94.53	12.35	0.2156	0.0689	14.51	130
140	7007.6	78.67	181.69	103.02	90.67	12.35	0.2306	0.0561	17.83	140

TABLE X.

SATURATED VAPOR OF AMMONIA.

ENGLISH UNITS.

Temperature, Degrees Fahrenheit.	Pressure, Pounds per Square Inch.	Heat of the Liquid.	Total Heat.	Heat of Vaporization.	Heat equivalent of Internal Work.	Heat equivalent of External Work.	Entropy of the Liquid.	Specific Volume.	Density: Weight, in pounds, of one Cubic Foot.	Temperature, Degrees Fahrenheit.
t	p	q	λ	r	ρ	Apu	$\int \frac{c\,dt}{T}$	s	γ	t
−40	9.93	−79	519	598	549	49	−0.1737	26.9	0.0373	−40
−35	11.53	−74	520	594	544	50	−0.1607	23.3	0.0429	−35
−30	13.36	−68	522	590	540	50	−0.1482	20.3	0.0492	−30
−25	15.40	−63	523	586	535	51	−0.1354	17.8	0.0562	−25
−20	17.70	−57	525	582	531	51	−0.1229	15.6	0.0640	−20
−15	20.25	−52	526	578	526	52	−0.1103	13.7	0.0726	−15
−10	23.10	−46	528	574	522	52	−0.0982	12.2	0.0821	−10
−5	26.25	−41	529	570	517	53	−0.0859	10.8	0.0925	−5
0	29.74	−35	531	566	513	53	−0.0738	9.63	0.104	0
5	33.58	−30	532	562	508	53	−0.0619	8.60	0.116	5
10	37.80	−24	534	558	504	54	−0.0501	7.71	0.130	10
15	42.43	−19	535	554	500	54	−0.0386	6.93	0.144	15
20	47.49	−13	537	550	495	55	−0.0271	6.24	0.160	20
25	53.01	−8	538	546	491	55	−0.0157	5.64	0.177	25
30	59.01	−2	540	542	486	56	−0.0044	5.11	0.196	30
35	65.53	3	541	538	482	56	0.0067	4.64	0.216	35
40	72.59	9	543	534	478	56	0.0177	4.20	0.237	40
45	80.21	14	544	530	473	57	0.0287	3.85	0.260	45
50	88.44	20	546	526	469	57	0.0395	3.52	0.284	50
55	97.30	25	547	522	464	58	0.0502	3.22	0.310	55
60	106.82	31	549	518	460	58	0.0608	2.96	0.338	60
65	117.04	36	550	514	456	58	0.0713	2.72	0.367	65
70	127.98	42	552	510	451	59	0.0817	2.51	0.398	70
75	139.67	47	553	506	447	59	0.0921	2.32	0.431	75
80	152.15	53	555	502	442	60	0.1023	2.14	0.467	80
85	165.47	58	556	498	438	60	0.1124	1.99	0.504	85
90	179.64	64	558	494	434	60	0.1224	1.82	0.543	90
95	194.70	69	559	490	428	61	0.1324	1.71	0.584	95
100	210.70	75	561	486	425	61	0.1423	1.59	0.627	100

TABLE XI.
SATURATED VAPOR OF SULPHUR DIOXIDE.

ENGLISH UNITS,

Temperature, Degrees Fahrenheit. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in pounds, of one Cubic Foot. γ	Temperature, Degrees Fahrenheit. t
−40	3.14	−29	166	195	182	13	−0.0632	23.0	0.0434	−40
−35	3.70	−27	167	194	180	14	−0.0584	19.7	0.0507	−35
−30	4.34	−25	168	193	179	14	−0.0539	17.0	0.0590	−30
−25	5.07	−23	168	191	177	14	−0.0492	14.7	0.0682	−25
−20	5.90	−21	169	190	176	14	−0.0447	12.7	0.0785	−20
−15	6.83	−19	170	189	175	14	−0.0401	11.1	0.0901	−15
−10	7.88	−17	170	187	173	14	−0.0357	9.73	0.103	−10
−5	9.05	−15	171	186	172	14	−0.0312	8.56	0.117	−5
0	10.35	−13	172	185	170	15	−0.0268	7.54	0.133	0
5	11.81	−11	172	183	168	15	−0.0225	6.67	0.150	5
10	13.41	−9	173	182	167	15	−0.0182	5.93	0.169	10
15	15.19	−7	174	181	166	15	−0.0140	5.29	0.189	15
20	17.15	−5	174	179	164	15	−0.0098	4.72	0.212	20
25	19.30	−3	175	178	163	15	−0.0057	4.23	0.236	25
30	21.66	−1	176	177	162	15	−0.0016	3.81	0.263	30
35	24.24	1	176	175	160	15	0.0024	3.43	0.291	35
40	27.06	3	177	174	158	16	0.0064	3.10	0.322	40
45	30.12	5	177	172	156	16	0.0104	2.81	0.356	45
50	33.45	7	178	171	155	16	0.0144	2.58	0.390	50
55	37.07	9	179	170	154	16	0.0182	2.32	0.430	55
60	40.98	11	179	168	152	16	0.0221	2.11	0.473	60
65	45.20	13	180	167	151	16	0.0259	1.94	0.516	65
70	49.75	15	181	166	150	16	0.0297	1.78	0.563	70
75	54.64	17	181	164	148	16	0.0334	1.63	0.614	75
80	59.90	19	182	163	146	17	0.0372	1.50	0.668	80
85	65.54	21	183	162	145	17	0.0409	1.38	0.725	85
90	71.57	23	183	160	143	17	0.0445	1.27	0.786	90
95	78.02	25	184	159	142	17	0.0482	1.18	0.849	95
100	84.90	27	185	158	141	17	0.0518	1.09	0.917	100

TABLE XII.

SPECIFIC GRAVITY AND SPECIFIC VOLUME OF LIQUIDS.

Name of Liquid.	Specific Gravity, compared with Water at 4° C.	Specific Volume. Cubic Meters per Kilo.
Alcohol, C_2H_6O	0.80625 [Mendelejeff, 1860]	0.001240
Ether, $C_4H_{10}O$	0.736 [Kopp, 1860]	0.001358
Chloroform.	1.527 [Thorpe, 1880]	0.000655
Carbon bisulphide, CS_2	1.2922 [Thorpe, 1880]	0.000774
Carbon tetrachloride, CCl_4 . .	1.6320 [Thorpe, 1880]	0.000613
Aceton, C_3H_6O	0.81 [Zander, 1882]	0.00123
Sulphur Dioxide SO_2	1.4336 [Andréeff, 1859]	0.0006981
Ammonia NH_3	0.6364 [Andréeff, 1859]	0.001571

TABLE XIII.

VOLUME OF WATER.

Vol. at 4° C=1.

[Rossetti, 1871] and [Hirn, 1867.]

Temperature.	Volume.	Temperature.	Volume.	Temperature.	Volume.	Temperature.	Volume.
10	1.000253	60	1.01691	110	1.0512	160	1.1018
20	1.001744	70	1.02256	120	1.0590	170	1.1130
30	1.00425	80	1.02887	130	1.0694	180	1.1268
40	1.00770	90	1.03567	140	1.0795	190	1.1403
50	1.01195	100	1.04312	150	1.0903	200	1.1544

	0	1	2	3	4	5	6	7	8	9
1.0	0.0000	0.00995	0.01980	0.02956	0.03922	0.04879	0.05827	0.06766	0.07696	0.08618
1.1	0.09531	0.1044	0.1133	0.1222	0.1310	0.1398	0.1484	0.1570	0.1655	0.1739
1.2	0.1823	0.1906	0.1988	0.2070	0.2151	0.2231	0.2311	0.2390	0.2469	0.2546
1.3	0.2624	0.2700	0.2776	0.2852	0.2927	0.3001	0.3075	0.3148	0.3221	0.3293
1.4	0.3365	0.3436	0.3507	0.3577	0.3646	0.3716	0.3784	0.3853	0.3920	0.3988
1.5	0.4055	0.4121	0.4187	0.4253	0.4318	0.4382	0.4447	0.4511	0.4574	0.4637
1.6	0.4700	0.4762	0.4824	0.4886	0.4947	0.5008	0.5068	0.5128	0.5188	0.5247
1.7	0.5306	0.5365	0.5423	0.5481	0.5539	0.5596	0.5653	0.5710	0.5766	0.5822
1.8	0.5878	0.5933	0.5988	0.6043	0.6098	0.6152	0.6206	0.6259	0.6313	0.6366
1.9	0.6418	0.6471	0.6523	0.6575	0.6627	0.6678	0.6729	0.6780	0.6831	0.6881
2.0	0.6931	0.6981	0.7031	0.7080	0.7129	0.7178	0.7227	0.7275	0.7324	0.7372
2.1	0.7419	0.7467	0.7514	0.7561	0.7608	0.7655	0.7701	0.7747	0.7793	0.7839
2.2	0.7884	0.7930	0.7975	0.8020	0.8065	0.8109	0.8154	0.8198	0.8242	0.8286
2.3	0.8329	0.8372	0.8416	0.8459	0.8502	0.8544	0.8587	0.8629	0.8671	0.8713
2.4	0.8755	0.8796	0.8838	0.8879	0.8920	0.8961	0.9002	0.9042	0.9083	0.9123
2.5	0.9163	0.9203	0.9243	0.9282	0.9322	0.9361	0.9400	0.9439	0.9478	0.9517
2.6	0.9555	0.9594	0.9632	0.9670	0.9708	0.9746	0.9783	0.9821	0.9858	0.9895
2.7	0.9933	0.9969	1.0006	1.0043	1.0080	1.0116	1.0152	1.0188	1.0225	1.0260
2.8	1.0296	1.0332	1.0367	1.0403	1.0438	1.0473	1.0508	1.0543	1.0578	1.0613
2.9	1.0647	1.0682	1.0716	1.0750	1.0784	1.0818	1.0852	1.0886	1.0919	1.0953
3.0	1.0986	1.1019	1.1053	1.1086	1.1119	1.1151	1.1184	1.1217	1.1249	1.1282
3.1	1.1314	1.1346	1.1378	1.1410	1.1442	1.1474	1.1506	1.1537	1.1569	1.1600
3.2	1.1632	1.1663	1.1694	1.1725	1.1756	1.1787	1.1817	1.1848	1.1878	1.1909
3.3	1.1939	1.1969	1.2000	1.2030	1.2060	1.2090	1.2119	1.2149	1.2179	1.2208
3.4	1.2238	1.2267	1.2296	1.2326	1.2355	1.2384	1.2413	1.2442	1.2470	1.2499
3.5	1.2528	1.2556	1.2585	1.2613	1.2641	1.2669	1.2698	1.2726	1.2754	1.2782
3.6	1.2809	1.2837	1.2865	1.2892	1.2920	1.2947	1.2975	1.3002	1.3029	1.3056
3.7	1.3083	1.3110	1.3137	1.3164	1.3191	1.3218	1.3244	1.3271	1.3297	1.3324
3.8	1.3350	1.3376	1.3403	1.3429	1.3455	1.3481	1.3507	1.3533	1.3558	1.3584
3.9	1.3610	1.3635	1.3661	1.3686	1.3712	1.3737	1.3762	1.3788	1.3813	1.3838
4.0	1.3863	1.3888	1.3913	1.3938	1.3962	1.3987	1.4012	1.4036	1.4061	1.4085
4.1	1.4110	1.4134	1.4159	1.4183	1.4207	1.4231	1.4255	1.4279	1.4303	1.4327
4.2	1.4351	1.4375	1.4398	1.4422	1.4446	1.4469	1.4493	1.4516	1.4540	1.4563
4.3	1.4586	1.4609	1.4633	1.4656	1.4679	1.4702	1.4725	1.4748	1.4770	1.4793
4.4	1.4816	1.4839	1.4861	1.4884	1.4907	1.4929	1.4951	1.4974	1.4996	1.5019
4.5	1.5041	1.5063	1.5085	1.5107	1.5129	1.5151	1.5173	1.5195	1.5217	1.5239
4.6	1.5261	1.5282	1.5304	1.5326	1.5347	1.5369	1.5390	1.5412	1.5433	1.5454
4.7	1.5476	1.5497	1.5518	1.5539	1.5560	1.5581	1.5602	1.5623	1.5644	1.5665
4.8	1.5686	1.5707	1.5728	1.5748	1.5769	1.5790	1.5810	1.5831	1.5851	1.5872
4.9	1.5892	1.5913	1.5933	1.5953	1.5974	1.5994	1.6014	1.6034	1.6054	1.6074
5.0	1.6094	1.6114	1.6134	1.6154	1.6174	1.6194	1.6214	1.6233	1.6253	1.6273
5.1	1.6292	1.6312	1.6332	1.6351	1.6371	1.6390	1.6409	1.6429	1.6448	1.6467
5.2	1.6487	1.6506	1.6525	1.6544	1.6563	1.6582	1.6601	1.6620	1.6639	1.6658
5.3	1.6677	1.6696	1.6715	1.6734	1.6752	1.6771	1.6790	1.6808	1.6827	1.6845
5.4	1.6864	1.6882	1.6901	1.6919	1.6938	1.6956	1.6974	1.6993	1.7011	1.7029
5.5	1.7047	1.7066	1.7084	1.7102	1.7120	1.7138	1.7156	1.7174	1.7192	1.7210
5.6	1.7228	1.7246	1.7263	1.7281	1.7299	1.7317	1.7334	1.7352	1.7370	1.7387

	0	1	2	3	4	5	6	7	8	9
5.7	1.7405	1.7422	1.7440	1.7457	1.7475	1.7492	1.7509	1.7527	1.7544	1.7561
5.8	1.7579	1.7596	1.7613	1.7630	1.7647	1.7664	1.7681	1.7699	1.7716	1.7733
5.9	1.7750	1.7766	1.7783	1.7800	1.7817	1.7834	1.7851	1.7867	1.7884	1.7901
6.0	1.7918	1.7934	1.7951	1.7967	1.7984	1.8001	1.8017	1.8034	1.8050	18.066
6.1	1.8083	1.8099	1.8116	1.8132	1.8148	1.8165	1.8181	1.8197	1.8213	1.8229
6.2	1.8245	1.8262	1.8278	1.8294	1.8310	1.8326	1.8342	1.8358	1.8374	1.8390
6.3	1.8405	1.8421	1.8437	1.8453	1.8469	1.8485	1.8500	1.8516	1.8532	1.8547
6.4	1.8563	1.8579	1.8594	1.8610	1.8625	1.8641	1.8656	1.8672	1.8687	1.8703
6.5	1.8718	1.8733	1.8749	1.8764	1.8779	1.8795	1.8810	1.8825	1.8840	1.8856
6.6	1.8871	1.8886	1.8901	1.8916	1.8931	1.8946	1.8961	1.8976	1.8991	1.9006
6.7	1.9021	1.9036	1.9051	1.9066	1.9081	1.9095	1.9110	1.9125	1.9140	1.9155
6.8	1.9169	1.9184	1.9199	1.9213	1.9228	1.9242	1.9257	1.9272	1.9286	1.9301
6.9	1.9315	1.9330	1.9344	1.9359	1.9373	1.9387	1.9402	1.9416	1.9430	1.9445
7.0	1.9459	1.9473	1.9488	1.9502	1.9516	1.9530	1.9544	1.9559	1.9573	1.9587
7.1	1.9601	1.9615	1.9629	1.9643	1.9657	1.9671	1.9685	1.9699	1.9713	1.9727
7.2	1.9741	1.9755	1.9769	1.9782	1.9796	1.9810	1.9824	1.9838	1.9851	1.9865
7.3	1.9879	1.9892	1.9906	1.9920	1.9933	1.9947	1.9961	1.9974	1.9988	2.0001
7.4	2.0015	2.0028	2.0042	2.0055	2.0069	2.0082	2.0096	2.0109	2.0122	2.0136
7.5	2.0149	2.0162	2.0176	2.0189	2.0202	2.0215	2.0229	2.0242	2.0255	2.0268
7.6	2.0281	2.0295	2.0308	2.0321	2.0334	2.0347	2.0360	2.0373	2.0386	2.0399
7.7	2.0412	2.0425	2.0438	2.0451	2.0464	2.0477	2.0490	2.0503	2.0516	2.0528
7.8	2.0541	2.0554	2.0567	2.0580	2.0592	2.0605	2.0618	2.0631	2.0643	2.0656
7.9	2.0668	2.0681	2.0694	2.0707	2.0719	2.0732	2.0744	2.0757	2.0769	2.0782
8.0	2.0794	2.0807	2.0819	2.0832	2.0844	2.0857	2.0869	2.0881	2.0894	2.0906
8.1	2.0919	2.0931	2.0943	2.0956	2.0968	2.0980	2.0992	2.1005	2.1017	2.1029
8.2	2.1041	2.1054	2.1066	2.1078	2.1090	2.1102	2.1114	2.1126	2.1138	2.1150
8.3	2.1163	2.1175	2.1187	2.1199	2.1211	2.1223	2.1235	2.1247	2.1258	2.1270
8.4	2.1282	2.1294	2.1306	2.1318	2.1330	2.1342	2.1353	2.1365	2.1377	2.1389
8.5	2.1401	2.1412	2.1424	2.1436	2.1448	2.1459	2.1471	2.1483	2.1494	2.1506
8.6	2.1518	2.1529	2.1541	2.1552	2.1564	2.1576	2.1587	2.1599	2.1610	2.1622
8.7	2.1633	2.1645	2.1656	2.1668	2.1679	2.1691	2.1702	2.1713	2.1725	2.1736
8.8	2.1748	2.1759	2.1770	2.1782	2.1793	2.1804	2.1815	2.1827	2.1838	2.1849
8.9	2.1861	2.1872	2.1883	2.1894	2.1905	2.1917	2.1928	2.1939	2.1950	2.1961
9.0	2.1972	2.1983	2.1994	2.2006	2.2017	2.2028	2.2039	2.2050	2.2061	2.2072
9.1	2.2083	2.2094	2.2105	2.2116	2.2127	2.2138	2.2148	2.2159	2.2170	2.2181
9.2	2.2192	2.2203	2.2214	2.2225	2.2235	2.2246	2.2257	2.2268	2.2279	2.2289
9.3	2.2300	2.2311	2.2322	2.2332	2.2343	2.2354	2.2364	2.2375	2.2386	2.2396
9.4	2.2407	2.2418	2.2428	2.2439	2.2450	2.2460	2.2471	2.2481	2.2492	2.2502
9.5	2.2513	2.2523	2.2534	2.2544	2.2555	2.2565	2.2576	2.2586	2.2597	2.2607
9.6	2.2618	2.2628	2.2638	2.2649	2.2659	2.2670	2.2680	2.2690	2.2701	2.2711
9.7	2.2721	2.2732	2.2742	2.2752	2.2762	2.2773	2.2783	2.2793	2.2803	2.2814
9.8	2.2824	2.2834	2.2844	2.2854	2.2865	2.2875	2.2885	2.2895	2.2905	2.2915
9.9	2.2925	2.2935	2.2946	2.2956	2.2966	2.2976	2.2986	2.2996	2.3006	2.3016
10.0	2.3026									

SHORT-TITLE CATALOGUE

OF THE

PUBLICATIONS

OF

JOHN WILEY & SONS,

NEW YORK.

LONDON: CHAPMAN & HALL, LIMITED.

ARRANGED UNDER SUBJECTS.

Descriptive circulars sent on application.
Books marked with an asterisk are sold at *net* prices only.
All books are bound in cloth unless otherwise stated.

AGRICULTURE.

CATTLE FEEDING—DAIRY PRACTICE—DISEASES OF ANIMALS—GARDENING, ETC.

Armsby's Manual of Cattle Feeding....................12mo, $1 75
Downing's Fruit and Fruit Trees........................8vo, 5 00
Grotenfelt's The Principles of Modern Dairy Practice. (Woll.) 12mo, 2 00
Kemp's Landscape Gardening.... ....12mo, 2 50
Loudon's Gardening for Ladies. (Downing.)...........12mo, 1 50
Maynard's Landscape Gardening.......................12mo, 1 50
Steel's Treatise on the Diseases of the Dog...............8vo, 3 50
" Treatise on the Diseases of the Ox.................8vo, 6 00
Stockbridge's Rocks and Soils.... . ...8vo, 2 50
Woll's Handbook for Farmers and Dairymen...........12mo, 1 50

ARCHITECTURE.

BUILDING—CARPENTRY—STAIRS—VENTILATION—LAW, ETC.

Berg's Buildings and Structures of American Railroads.....4to, 7 50
Birkmire's American Theatres—Planning and Construction.8vo, 3 00
" Architectural Iron and Steel..................8vo, 3 50
" Compound Riveted Girders...................8vo, 2 00
" Skeleton Construction in Buildings 8vo, 3 00

Birkmire's Planning and Construction of High Office Buildings.
8vo, $3 50

Carpenter's Heating and Ventilating of Buildings..........8vo, 3 00

Freitag's Architectural Engineering.... ....8vo, 2 50

Gerhard's Sanitary House Inspection....................16mo, 1 00

" Theatre Fires and Panics....................12mo, 1 50

Hatfield's American House Carpenter.....................8vo, 5 00

Holly's Carpenter and Joiner.. ....18mo, 75

Kidder's Architect and Builder's Pocket-book...16mo, morocco, 4 00

Merrill's Stones for Building and Decoration..............8vo, 5 00

Monckton's Stair Building—Wood, Iron, and Stone........4to, 4 00

Wait's Engineering and Architectural Jurisprudence.......8vo, 6 00

Sheep, 6 50

Worcester's Small Hospitals—Establishment and Maintenance, including Atkinson's Suggestions for Hospital Architecture... ....12mo, 1 25

World's Columbian Exposition of 1893.............Large 4to, 2 50

ARMY, NAVY, Etc.

MILITARY ENGINEERING—ORDNANCE—LAW, ETC.

Bourne's Screw Propellers...............................4to, 5 00

*Bruff's Ordnance and Gunnery..........................8vo, 6 00

Chase's Screw Propellers........... ....8vo, 3 00

Cooke's Naval Ordnance 8vo, 12 50

Cronkhite's Gunnery for Non-com. Officers.....32mo, morocco, 2 00

*Davis's Treatise on Military Law........................8vo, 7 00

Sheep, 7 50

* " Elements of Law..................................8vo, 2 50

De Brack's Cavalry Outpost Duties. (Carr.)....32mo, morocco, 2 00

Dietz's Soldier's First Aid....................16mo, morocco, 1 25

*Dredge's Modern French Artillery....Large 4to, half morocco, 15 00

" Record of the Transportation Exhibits Building, World's Columbian Exposition of 1893..4to, half morocco, 10 00

Durand's Resistance and Propulsion of Ships..............8vo, 5 00

Dyer's Light Artillery...................................12mo, 3 00

Hoff's Naval Tactics.....................................8vo, 1 50

*Ingalls's Ballistic Tables...............................8vo, 1 50

Mahan's Permanent Fortifications. (Mercur.).8vo, half morocco,		$7 50
Mercur's Attack of Fortified Places	12mo,	2 00
" Elements of the Art of War	8vo,	4 00
Metcalfe's Ordnance and Gunnery	12mo, with Atlas,	5 00
Murray's A Manual for Courts-Martial	16mo, morocco,	1 50
" Infantry Drill Regulations adapted to the Springfield Rifle, Caliber .45	32mo, paper,	10
* Phelps's Practical Marine Surveying	8vo,	2 50
Powell's Army Officer's Examiner	12mo,	4 00
Sharpe's Subsisting Armies	32mo, morocco,	1 50
Very's Navies of the World	8vo, half morocco,	3 50
Wheeler's Siege Operations	8vo,	2 00
Winthrop's Abridgment of Military Law	12mo,	2 50
Woodhull's Notes on Military Hygiene	16mo,	1 50
Young's Simple Elements of Navigation	16mo, morocco,	2 00
" " " " " first edition		1 00

ASSAYING.

SMELTING—ORE DRESSING—ALLOYS, ETC.

Fletcher's Quant. Assaying with the Blowpipe	16mo, morocco,	1 50
Furman's Practical Assaying	8vo,	3 00
Kunhardt's Ore Dressing	8vo,	1 50
O'Driscoll's Treatment of Gold Ores	8vo,	2 00
Ricketts and Miller's Notes on Assaying	8vo,	3 00
Thurston's Alloys, Brasses, and Bronzes	8vo,	2 50
Wilson's Cyanide Processes	12mo,	1 50
" The Chlorination Process	12mo,	1 50

ASTRONOMY.

PRACTICAL, THEORETICAL, AND DESCRIPTIVE.

Craig's Azimuth	4to,	3 50
Doolittle's Practical Astronomy	8vo,	4 00
Gore's Elements of Geodesy	8vo,	2 50
Hayford's Text-book of Geodetic Astronomy	8vo.	3 00
* Michie and Harlow's Practical Astronomy	8vo,	3 00
* White's Theoretical and Descriptive Astronomy	12mo,	2 00

BOTANY.

Gardening for Ladies, Etc.

Baldwin's Orchids of New England	Small 8vo,	$1 50
Loudon's Gardening for Ladies. (Downing.)	12mo,	1 50
Thomé's Structural Botany	16mo,	2 25
Westermaier's General Botany. (Schneider.)	8vo,	2 00

BRIDGES, ROOFS, Etc.

Cantilever—Draw—Highway—Suspension.

(*See also* Engineering, p. 7.)

Boller's Highway Bridges	8vo,	2 00
* " The Thames River Bridge	4to, paper,	5 00
Burr's Stresses in Bridges	8vo,	3 50
Crehore's Mechanics of the Girder	8vo,	5 00
Dredge's Thames Bridges	7 parts, per part,	1 25
Du Bois's Stresses in Framed Structures	Small 4to,	10 00
Foster's Wooden Trestle Bridges	4to,	5 00
Greene's Arches in Wood, etc.	8vo,	2 50
" Bridge Trusses	8vo,	2 50
" Roof Trusses	8vo,	1 25
Howe's Treatise on Arches	8vo,	4 00
Johnson's Modern Framed Structures	Small 4to,	10 00
Merriman & Jacoby's Text-book of Roofs and Bridges. Part I., Stresses	8vo,	2 50
Merriman & Jacoby's Text-book of Roofs and Bridges. Part II., Graphic Statics	8vo,	2 50
Merriman & Jacoby's Text-book of Roofs and Bridges. Part III., Bridge Design	8vo,	2 50
Merriman & Jacoby's Text-book of Roofs and Bridges. Part IV., Continuous, Draw, Cantilever, Suspension, and Arched Bridges	8vo,	2 50
* Morison's The Memphis Bridge	Oblong 4to,	10 00
Waddell's Iron Highway Bridges	8vo,	4 00
" De Pontibus (a Pocket-book for Bridge Engineers).	16mo, morocco,	3 00
Wood's Construction of Bridges and Roofs	8vo,	2 00

CHEMISTRY.

QUALITATIVE—QUANTITATIVE—ORGANIC—INORGANIC, ETC.

Adriance's Laboratory Calculations	12mo,	$1 25
Allen's Tables for Iron Analysis	8vo,	3 00
Austen's Notes for Chemical Students	12mo,	1 50
Bolton's Student's Guide in Quantitative Analysis	8vo,	1 50
Classen's Analysis by Electrolysis. (Herrick and Boltwood.)	8vo,	3 00
Crafts's Qualitative Analysis. (Schaeffer.)	12mo,	1 50
Drechsel's Chemical Reactions. (Merrill.)	12mo,	1 25
Fresenius's Quantitative Chemical Analysis. (Allen.)	8vo,	6 00
" Qualitative " " (Johnson.)	8vo,	3 00
" " " " (Wells.) Trans. 16th German Edition	8vo,	5 00
Fuertes's Water and Public Health	12mo,	1 50
Gill's Gas and Fuel Analysis	12mo,	1 25
Hammarsten's Physiological Chemistry. (Mandel.)	8vo,	4 00
Helm's Principles of Mathematical Chemistry. (Morgan).	12mo,	1 50
Kolbe's Inorganic Chemistry	12mo,	1 50
Ladd's Quantitative Chemical Analysis	12mo,	1 00
Landauer's Spectrum Analysis. (Tingle.)	8vo,	3 00
Löb's Electrolysis and Electrosynthesis of Organic Compounds. (Lorenz.)	12mo,	1 00
Mandel's Bio-chemical Laboratory	12mo,	1 50
Mason's Water-supply	8vo,	5 00
" Examination of Water	12mo,	1 25
Meyer's Organic Analysis. (Tingle.) (*In the press.*)		
Miller's Chemical Physics	8vo,	2 00
Mixter's Elementary Text-book of Chemistry	12mo,	1 50
Morgan's The Theory of Solutions and its Results	12mo,	1 00
" Elements of Physical Chemistry	12mo,	2 00
Nichols's Water-supply (Chemical and Sanitary)	8vo,	2 50
O'Brine's Laboratory Guide to Chemical Analysis	8vo,	2 00
Perkins's Qualitative Analysis	12mo,	1 00
Pinner's Organic Chemistry. (Austen.)	12mo,	1 50
Poole's Calorific Power of Fuels	8vo,	3 00
Ricketts and Russell's Notes on Inorganic Chemistry (Non-metallic)	Oblong 8vo, morocco,	75

Schimpf's Volumetric Analysis..........................12mo, $2 50

Spencer's Sugar Manufacturer's Handbook.....16mo, morocco, 2 00

" Handbook for Chemists of Beet Sugar Houses. 16mo, morocco, 3 00

Stockbridge's Rocks and Soils..........................8vo, 2 50

Tillman's Descriptive General Chemistry. (*In the press.*)

Van Deventer's Physical Chemistry for Beginners. (Boltwood.) 12mo, 1 50

Wells's Inorganic Qualitative Analysis.................12mo, 1 50

" Laboratory Guide in Qualitative Chemical Analysis. 8vo, 1 50

Whipple's Microscopy of Drinking-water.................8vo, 3 50

Wiechmann's Chemical Lecture Notes.....................12mo, 3 00

" Sugar Analysis.......................Small 8vo, 2 50

Wulling's Inorganic Phar. and Med. Chemistry..........12mo, 2 00

DRAWING.

ELEMENTARY—GEOMETRICAL—MECHANICAL—TOPOGRAPHICAL.

Hill's Shades and Shadows and Perspective..............8vo, 2 00

MacCord's Descriptive Geometry.........................8vo, 3 00

" Kinematics.....................................8vo, 5 00

" Mechanical Drawing.............................8vo, 4 00

Mahan's Industrial Drawing. (Thompson.)........2 vols., 8vo, 3 50

Reed's Topographical Drawing. (H. A.)..................4to, 5 00

Reid's A Course in Mechanical Drawing..................8vo. 2 00

" Mechanical Drawing and Elementary Machine Design. 8vo. (*In the press.*)

Smith's Topographical Drawing. (Macmillan.)............8vo, 2 50

Warren's Descriptive Geometry..................2 vols., 8vo, 3 50

" Drafting Instruments...........................12mo, 1 25

" Free-hand Drawing..............................12mo, 1 00

" Linear Perspective.............................12mo, 1 00

" Machine Construction...................2 vols., 8vo, 7 50

" Plane Problems.................................12mo, 1 25

" Primary Geometry...............................12mo, 75

" Problems and Theorems..........................8vo, 2 50

Warren's Shades and Shadows	8vo,	$3 00
" Stereotomy—Stone-cutting	8vo,	2 50
Whelpley's Letter Engraving	12mo,	2 00

ELECTRICITY AND MAGNETISM.

ILLUMINATION—BATTERIES—PHYSICS—RAILWAYS.

Anthony and Brackett's Text-book of Physics. (Magie.)	Small 8vo,	3 00
Anthony's Theory of Electrical Measurements	12mo,	1 00
Barker's Deep-sea Soundings	8vo,	2 00
Benjamin's Voltaic Cell	8vo,	3 00
" History of Electricity	8vo,	3 00
Classen's Analysis by Electrolysis. (Herrick and Boltwood.)	8vo,	3 00
Cosmic Law of Thermal Repulsion	12mo,	75
Crehore and Squier's Experiments with a New Polarizing Photo-Chronograph	8vo,	3 00
Dawson's Electric Railways and Tramways.	Small, 4to, half morocco,	12 50
* Dredge's Electric Illuminations	2 vols., 4to, half morocco,	25 00
" " " Vol. II	4to,	7 50
Gilbert's De magnete. (Mottelay.)	8vo,	2 50
Holman's Precision of Measurements	8vo,	2 00
" Telescope-mirror-scale Method	Large 8vo,	75
Löb's Electrolysis and Electrosynthesis of Organic Compounds. (Lorenz.)	12mo,	1 00
*Michie's Wave Motion Relating to Sound and Light,	8vo,	4 00
Morgan's The Theory of Solutions and its Results	12mo,	1 00
Niaudet's Electric Batteries. (Fishback.)	12mo,	2 50
Pratt and Alden's Street-railway Road-beds	8vo,	2 00
Reagan's Steam and Electric Locomotives	12mo,	2 00
Thurston's Stationary Steam Engines for Electric Lighting Purposes	8vo,	2 50
*Tillman's Heat	8vo,	1 50

ENGINEERING.

Civil—Mechanical—Sanitary, Etc.

(*See also* Bridges, p. 4; Hydraulics, p. 9; Materials of Engineering, p. 10; Mechanics and Machinery, p. 12; Steam Engines and Boilers, p. 14.)

Baker's Masonry Construction........................8vo, $5 00
"   Surveying Instruments..........................12mo, 3 00
Black's U. S. Public Works......................Oblong 4to, 5 00
Brooks's Street-railway Location...............16mo, morocco, 1 50
Butts's Civil Engineers' Field Book............16mo, morocco, 2 50
Byrne's Highway Construction...........................8vo, 5 00
"   Inspection of Materials and Workmanship.......16mo, 3 00
Carpenter's Experimental Engineering 8vo, 6 00
Church's Mechanics of Engineering—Solids and Fluids....8vo, 6 00
"   Notes and Examples in Mechanics...............8vo, 2 00
Crandall's Earthwork Tables.........................8vo, 1 50
"   The Transition Curve..................16mo, morocco, 1 50
*Dredge's Penn. Railroad Construction, etc. Large 4to, half morocco, 20 00
* Drinker's Tunnelling.....................4to, half morocco, 25 00
Eissler's Explosives—Nitroglycerine and Dynamite....... 8vo, 4 00
Folwell's Sewerage.....................................8vo, 3 00
Fowler's Coffer-dam Process for Piers..................8vo, 2 50
Gerhard's Sanitary House Inspection....................12mo, 1 00
Godwin's Railroad Engineer's Field-book......16mo, morocco, 2 50
Gore's Elements of Geodesy............................8vo, 2 50
Howard's Transition Curve Field-book.........16mo, morocco, 1 50
Howe's Retaining Walls (New Edition.).................12mo, 1 25
Hudson's Excavation Tables. Vol. II................... 8vo, 1 00
Hutton's Mechanical Engineering of Power Plants........8vo, 5 00
Johnson's Materials of Construction..............Large 8vo, 6 00
"   Stadia Reduction Diagram..Sheet, $22\frac{1}{2} \times 28\frac{1}{2}$ inches, 50
"   Theory and Practice of Surveying.........Small 8vo, 4 00
Kent's Mechanical Engineer's Pocket-book.....16mo, morocco, 5 00
Kiersted's Sewage Disposal............................12mo, 1 25
Mahan's Civil Engineering. (Wood.)....................8vo, 5 00
Merriman and Brook's Handbook for Surveyors....16mo, mor., 2 00
Merriman's Geodetic Surveying..........................8vo, 2 00
"   Retaining Walls and Masonry Dams..............8vo, 2 00
"   Sanitary Engineering..........................8vo, 2 00
Nagle's Manual for Railroad Engineers.........16mo, morocco, 3 00
Ogden's Sewer Design. (*In the press.*)
Patton's Civil Engineering..................8vo, half morocco, 7 50

Patton's Foundations....................................8vo, $5 00
Pratt and Alden's Street-railway Road-beds..............8vo, 2 00
Rockwell's Roads and Pavements in France........ ....12mo, 1 25
Searles's Field Engineering..................16mo, morocco, 3 00
" Railroad Spiral.................. .....16mo, morocco, 1 50
Siebert and Biggin's Modern Stone Cutting and Masonry...8vo, 1 50
Smart's Engineering Laboratory Practice...............12mo, 2 50
Smith's Wire Manufacture and Uses..............Small 4to, 3 00
Spalding's Roads and Pavements..... ....12mo, 2 00
" Hydraulic Cement.............................12mo, 2 00
Taylor's Prismoidal Formulas and Earthwork.............8vo, 1 50
Thurston's Materials of Construction......................8vo, 5 00
* Trautwine's Civil Engineer's Pocket-book....16mo, morocco, 5 00
* " Cross-section...............................Sheet, 25
* " Excavations and Embankments.............8vo, 2 00
* " Laying Out Curves.............12mo, morocco, 2 50
Waddell's De Pontibus (A Pocket-book for Bridge Engineers). 16mo, morocco, 3 00
Wait's Engineering and Architectural Jurisprudence.......8vo, 6 00
Sheep, 6 50
" Law of Field Operation in Engineering, etc........8vo.
Warren's Stereotomy—Stone-cutting.....................8vo, 2 50
*Webb's Engineering Instruments............16mo, morocco, 50
" " " New Edition............. 1 25
Wegmann's Construction of Masonry Dams...............4to, 5 00
Wellington's Location of Railways................Small 8vo, 5 00
Wheeler's Civil Engineering..............................8vo, 4 00
Wolff's Windmill as a Prime Mover.......................8vo, 3 00

HYDRAULICS.

Water-wheels—Windmills—Service Pipe—Drainage, Etc.

(*See also* Engineering, p. 7.)

Bazin's Experiments upon the Contraction of the Liquid Vein. (Trautwine.)..8vo, 2 00
Bovey's Treatise on Hydraulics...........................8vo, 4 00
Coffin's Graphical Solution of Hydraulic Problems.......12mo, 2 50
Ferrel's Treatise on the Winds, Cyclones, and Tornadoes...8vo, 4 00
Fuertes's Water and Public Health.....................12mo, 1 50
Ganguillet & Kutter's Flow of Water. (Hering & Trautwine.) 8vo, 4 00
Hazen's Filtration of Public Water-Suppl

Kiersted's Sewage Disposal	12mo,	$1 25
Mason's Water Supply	8vo,	5 00
" Examination of Water	12mo,	1 25
Merriman's Treatise on Hydraulics	8vo,	4 00
Nichols's Water Supply (Chemical and Sanitary)	8vo,	2 50
Wegmann's Water Supply of the City of New York	4to,	10 00
Weisbach's Hydraulics. (Du Bois.)	8vo,	5 00
Whipple's Microscopy of Drinking Water	8vo,	3 50
Wilson's Irrigation Engineering	8vo,	4 00
" Hydraulic and Placer Mining	12mo,	2 00
Wolff's Windmill as a Prime Mover	8vo,	3 00
Wood's Theory of Turbines	8vo,	2 50

MANUFACTURES.

BOILERS—EXPLOSIVES—IRON—STEEL—SUGAR—WOOLLENS, ETC.

Allen's Tables for Iron Analysis	8vo,	3 00
Beaumont's Woollen and Worsted Manufacture	12mo,	1 50
Bolland's Encyclopædia of Founding Terms	12mo,	3 00
" The Iron Founder	12mo,	2 50
" " " " Supplement	12mo,	2 50
Bouvier's Handbook on Oil Painting	12mo,	2 00
Eissler's Explosives, Nitroglycerine and Dynamite	8vo,	4 00
Ford's Boiler Making for Boiler Makers	18mo,	1 00
Metcalfe's Cost of Manufactures	8vo,	5 00
Metcalf's Steel—A Manual for Steel Users	12mo,	2 00
* Reisig's Guide to Piece Dyeing	8vo,	25 00
Spencer's Sugar Manufacturer's Handbook	16mo, morocco,	2 00
" Handbook for Chemists of Beet Sugar Houses.	16mo, morocco,	3 00
Thurston's Manual of Steam Boilers	8vo,	5 00
Walke's Lectures on Explosives	8vo,	4 00
West's American Foundry Practice	12mo,	2 50
" Moulder's Text-book	12mo,	2 50
Wiechmann's Sugar Analysis	Small 8vo,	2 50
Woodbury's Fire Protection of Mills	8vo,	2 50

MATERIALS OF ENGINEERING.

STRENGTH—ELASTICITY—RESISTANCE, ETC.

(See also ENGINEERING, p. 7.)

Baker's Masonry Construction	8vo,	5 00
Beardslee and Kent's Strength of Wrought Iron	8vo,	1 50
Bovey's Strength of Materials	8vo,	7 50
Burr's Elasticity and Resistance of Materials	8vo,	5 00
Byrne's Highway Construction	8vo,	5 00

Lanza's Applied Mechanics	8vo,	7 50
Martens's Materials. (Henning.)	8vo. (*In the press.*)	
Merrill's Stones for Building and Decoration	8vo,	5 00
Merriman's Mechanics of Materials	8vo,	4 00
" Strength of Materials	12mo,	1 00
Patton's Treatise on Foundations	8vo,	5 00
Rockwell's Roads and Pavements in France	12mo,	1 25
Spalding's Roads and Pavements	12mo,	2 00
Thurston's Materials of Construction	8vo,	5 00
" Materials of Engineering	3 vols., 8vo,	8 00
Vol. I., Non-metallic	8vo,	2 00
Vol. II., Iron and Steel	8vo,	3 50
Vol. III., Alloys, Brasses, and Bronzes	8vo,	2 50
Wood's Resistance of Materials	8vo,	2 00

MATHEMATICS.

Calculus—Geometry—Trigonometry, Etc.

Baker's Elliptic Functions	8vo,	1 50
Ballard's Pyramid Problem	8vo,	1 50
Barnard's Pyramid Problem	8vo,	1 50
*Bass's Differential Calculus	12mo,	4 00
Briggs's Plane Analytical Geometry	12mo,	1 00
Chapman's Theory of Equations	12mo,	1 50
Compton's Logarithmic Computations	12mo,	1 50
Davis's Introduction to the Logic of Algebra	8vo,	1 50
Halsted's Elements of Geometry	8vo,	1 75
" Synthetic Geometry	8vo,	1 50
Johnson's Curve Tracing	12mo,	1 00
" Differential Equations—Ordinary and Partial.	Small 8vo,	3 50
" Integral Calculus	12mo,	1 50
" " " Unabridged. Small 8vo.	(*In the press.*)	
" Least Squares	12mo,	1 50
*Ludlow's Logarithmic and Other Tables. (Bass.)	8vo,	2 00
* " Trigonometry with Tables. (Bass.)	8vo,	3 00
*Mahan's Descriptive Geometry (Stone Cutting)	8vo,	1 50
Merriman and Woodward's Higher Mathematics	8vo,	5 00
Merriman's Method of Least Squares	8vo,	2 00
Parker's Quadrature of the Circle	8vo,	2 50
Rice and Johnson's Differential and Integral Calculus,	2 vols. in 1, small 8vo,	2 50

Rice and Johnson's Differential Calculus............Small 8vo, $3 00
" Abridgment of Differential Calculus.
Small 8vo, 1 50
Totten's Metrology..8vo, 2 50
Warren's Descriptive Geometry.......................2 vols., 8vo, 3 50
" Drafting Instruments.......................................12mo, 1 25
" Free-hand Drawing...12mo, 1 00
" Higher Linear Perspective.................................8vo, 3 50
" Linear Perspective...12mo, 1 00
" Primary Geometry..12mo, 75
" Plane Problems..12mo, 1 25
" Problems and Theorems......................................8vo, 2 50
" Projection Drawing...12mo, 1 50
Wood's Co-ordinate Geometry.................................8vo, 2 00
" Trigonometry...12mo, 1 00
Woolf's Descriptive Geometry...........................Large 8vo, 3 00

MECHANICS—MACHINERY.

Text-books and Practical Works.

(*See also* Engineering, p. 7.)

Baldwin's Steam Heating for Buildings.....................12mo, 2 50
Benjamin's Wrinkles and Recipes...........................12mo, 2 00
Chordal's Letters to Mechanics..............................12mo, 2 00
Church's Mechanics of Engineering...........................8vo, 6 00
" Notes and Examples in Mechanics.........................8vo, 2 00
Crehore's Mechanics of the Girder............................8vo, 5 00
Cromwell's Belts and Pulleys.................................12mo, 1 50
" Toothed Gearing...12mo, 1 50
Compton's First Lessons in Metal Working................12mo, 1 50
Compton and De Groodt's Speed Lathe.....................12mo, 1 50
Dana's Elementary Mechanics.................................12mo, 1 50
Dingey's Machinery Pattern Making.........................12mo, 2 00
Dredge's Trans. Exhibits Building, World Exposition.
Large 4to, half morocco, 10 00
Du Bois's Mechanics. Vol. I., Kinematics....................8vo, 3 50
" " Vol. II., Statics..8vo, 4 00
" " Vol. III., Kinetics...8vo, 3 50
Fitzgerald's Boston Machinist................................18mo, 1 00
Flather's Dynamometers.......................................12mo, 2 00
" Rope Driving..12mo, 2 00
Hall's Car Lubrication..12mo, 1 00
Holly's Saw Filing..18mo, 75
Johnson's Theoretical Mechanics. An Elementary Treatise

Jones's Machine Design. Part II., Strength and Proportion of Machine Parts	8vo,	$3 00
Lanza's Applied Mechanics	8vo,	7 50
MacCord's Kinematics	8vo,	5 00
Merriman's Mechanics of Materials	8vo,	4 00
Metcalfe's Cost of Manufactures	8vo,	5 00
*Michie's Analytical Mechanics	8vo,	4 00
Richards's Compressed Air	12mo,	1 50
Robinson's Principles of Mechanism	8vo,	3 00
Smith's Press-working of Metals	8vo,	3 00
Thurston's Friction and Lost Work	8vo,	3 00
" The Animal as a Machine	12mo,	1 00
Warren's Machine Construction	2 vols., 8vo,	7 50
Weisbach's Hydraulics and Hydraulic Motors. (Du Bois.)	8vo,	5 00
" Mechanics of Engineering. Vol. III., Part I., Sec. I. (Klein.)	8vo,	5 00
Weisbach's Mechanics of Engineering. Vol. III., Part I., Sec. II. (Klein.)	8vo,	5 00
Weisbach's Steam Engines. (Du Bois.)	8vo,	5 00
Wood's Analytical Mechanics	8vo,	3 00
" Elementary Mechanics	12mo,	1 25
" " " Supplement and Key	12mo,	1 25

METALLURGY.

IRON—GOLD—SILVER—ALLOYS, ETC.

Allen's Tables for Iron Analysis	8vo,	3 00
Egleston's Gold and Mercury	Large 8vo,	7 50
" Metallurgy of Silver	Large 8vo,	7 50
* Kerl's Metallurgy—Copper and Iron	8vo,	15 00
* " " Steel, Fuel, etc.	8vo,	15 00
Kunhardt's Ore Dressing in Europe	8vo,	1 50
Metcalf's Steel—A Manual for Steel Users	12mo,	2 00
O'Driscoll's Treatment of Gold Ores	8vo,	2 00
Thurston's Iron and Steel	8vo,	3 50
" Alloys	8vo,	2 50
Wilson's Cyanide Processes	12mo,	1 50

MINERALOGY AND MINING.

MINE ACCIDENTS—VENTILATION—ORE DRESSING, ETC.

Barringer's Minerals of Commercial Value	Oblong morocco,	2 50
Beard's Ventilation of Mines	12mo,	2 50
Boyd's Resources of South Western Virginia	8vo,	3 00
" Map of South Western Virginia	Pocket-book form,	2 00

Brush and Penfield's Determinative Mineralogy. New Ed. 8vo, $4 00
Chester's Catalogue of Minerals..............................8vo, 1 25
" " " " ....Paper, 50
" Dictionary of the Names of Minerals..............8vo, 3 00
Dana's American Localities of Minerals..............Large 8vo, 1 00
" Descriptive Mineralogy. (E. S.)....Large half morocco, 12 50
" Mineralogy and Petrography. (J. D.)............12mo, 2 00
" Minerals and How to Study Them. (E. S.).......12mo, 1 50
" Text-book of Mineralogy. (E. S.)...New Edition. 8vo, 4 00
* Drinker's Tunnelling, Explosives, Compounds, and Rock Drills.
4to, half morocco, 25 00
Egleston's Catalogue of Minerals and Synonyms............8vo, 2 50
Eissler's Explosives—Nitroglycerine and Dynamite.........8vo, 4 00
Hussak's Rock-forming Minerals. (Smith.).........Small 8vo, 2 00
Ihlseng's Manual of Mining..............................8vo, 4 00
Kunhardt's Ore Dressing in Europe........................8vo, 1 50
O'Driscoll's Treatment of Gold Ores......................8vo, 2 00
* Penfield's Record of Mineral Tests.............Paper, 8vo, 50
Rosenbusch's Microscopical Physiography of Minerals and
Rocks. (Iddings.).......................................8vo, 5 00
Sawyer's Accidents in Mines........................Large 8vo, 7 00
Stockbridge's Rocks and Soils............................8vo, 2 50
Walke's Lectures on Explosives...........................8vo, 4 00
Williams's Lithology.....................................8vo, 3 00
Wilson's Mine Ventilation...............................12mo, 1 25
" Hydraulic and Placer Mining.......................12mo, 2 50

STEAM AND ELECTRICAL ENGINES, BOILERS, Etc.

STATIONARY—MARINE—LOCOMOTIVE—GAS ENGINES, ETC.

(*See also* ENGINEERING, p. 7.)

Baldwin's Steam Heating for Buildings...................12mo, 2 50
Clerk's Gas Engine...............................Small 8vo, 4 00
Ford's Boiler Making for Boiler Makers..................18mo, 1 00
Hemenway's Indicator Practice...........................12mo, 2 00
Hoadley's Warm-blast Furnace.............................8vo, 1 50
Kneass's Practice and Theory of the Injector.............8vo, 1 50
MacCord's Slide Valve....................................8vo, 2 00
Meyer's Modern Locomotive Construction...................4to, 10 00
Peabody and Miller's Steam-boilers.......................8vo, 4 00
Peabody's Tables of Saturated Steam......................8vo, 1 00
" Thermodynamics of the Steam Engine...............8vo, 5 00
" Valve Gears for the Steam-Engine..................8vo, 2 50
the Indicator..........................Large 8vo, 2 50

Reagan's Steam and Electric Locomotives	12mo,	$2 00
Röntgen's Thermodynamics. (Du Bois.)	8vo,	5 00
Sinclair's Locomotive Running	12mo,	2 00
Snow's Steam-boiler Practice	8vo. (*In the press.*)	
Thurston's Boiler Explosions	12mo,	1 50
" Engine and Boiler Trials	8vo,	5 00
" Manual of the Steam Engine. Part I., Structure and Theory	8vo,	6 00
" Manual of the Steam Engine. Part II., Design, Construction, and Operation	8vo,	6 00
	2 parts,	10 00
Thurston's Philosophy of the Steam Engine	12mo,	75
" Reflection on the Motive Power of Heat. (Carnot.)	12mo,	1 50
" Stationary Steam Engines	8vo,	2 50
" Steam-boiler Construction and Operation	8vo,	5 00
Spangler's Valve Gears	8vo,	2 50
Weisbach's Steam Engine. (Du Bois.)	8vo,	5 00
Whitham's Constructive Steam Engineering	8vo,	6 00
" Steam-engine Design	8vo,	5 00
Wilson's Steam Boilers. (Flather.)	12mo,	2 50
Wood's Thermodynamics, Heat Motors, etc	8vo,	4 00

TABLES, WEIGHTS, AND MEASURES.

For Actuaries, Chemists, Engineers, Mechanics—Metric Tables, Etc.

Adriance's Laboratory Calculations	12mo,	1 25
Allen's Tables for Iron Analysis	8vo,	3 00
Bixby's Graphical Computing Tables	Sheet,	25
Compton's Logarithms	12mo,	1 50
Crandall's Railway and Earthwork Tables	8vo,	1 50
Egleston's Weights and Measures	18mo,	75
Fisher's Table of Cubic Yards	Cardboard,	25
Hudson's Excavation Tables. Vol. II	8vo,	1 00
Johnson's Stadia and Earthwork Tables	8vo,	1 25
Ludlow's Logarithmic and Other Tables. (Bass.)	12mo,	2 00
Totten's Metrology	8vo,	2 50

VENTILATION.

Steam Heating—House Inspection—Mine Ventilation.

Baldwin's Steam Heating	12mo,	2 50
Beard's Ventilation of Mines	12mo,	2 50
Carpenter's Heating and Ventilating of Buildings	8vo,	3 00
Gerhard's Sanitary House Inspection	12mo,	1 00
Reid's Ventilation of American Dwellings	12mo,	1 50

MISCELLANEOUS PUBLICATIONS.

Alcott's Gems, Sentiment, Language................Gilt edges,	$5 00
Bailey's The New Tale of a Tub..........................8vo,	75
Ballard's Solution of the Pyramid Problem...............8vo,	1 50
Barnard's The Metrological System of the Great Pyramid..8vo,	1 50
Davis's Elements of Law.................................8vo,	2 00
Emmon's Geological Guide-book of the Rocky Mountains..8vo,	1 50
Ferrel's Treatise on the Winds..........................8vo,	4 00
Haines's Addresses Delivered before the Am. Ry. Assn...12mo.	2 50
Mott's The Fallacy of the Present Theory of Sound..Sq. 16mo,	1 00
Perkins's Cornell University.....................Oblong 4to,	1 50
Ricketts's History of Rensselaer Polytechnic Institute.....8vo,	3 00
Rotherham's The New Testament Critically Emphasized. 12mo,	1 50
" The Emphasized New Test. A new translation. Large 8vo,	2 00
Totten's An Important Question in Metrology.............8vo,	2 50
Whitehouse's Lake Mœris..............................Paper,	25
* Wiley's Yosemite, Alaska, and Yellowstone..............4to,	3 00

HEBREW AND CHALDEE TEXT-BOOKS.

FOR SCHOOLS AND THEOLOGICAL SEMINARIES.

Gesenius's Hebrew and Chaldee Lexicon to Old Testament. (Tregelles.)....................Small 4to, half morocco,	5 00
Green's Elementary Hebrew Grammar...................12mo,	1 25
" Grammar of the Hebrew Language (New Edition).8vo,	3 00
" Hebrew Chrestomathy............................8vo,	2 00
Letteris's Hebrew Bible (Massoretic Notes in English). 8vo, arabesque,	2 25

MEDICAL.

Bull's Maternal Management in Health and Disease.......12mo,	1 00
Hammarsten's Physiological Chemistry. (Mandel.)........8vo,	4 00
Mott's Composition, Digestibility, and Nutritive Value of Food. Large mounted chart,	1 25
Ruddiman's Incompatibilities in Prescriptions............8vo,	2 00
Steel's Treatise on the Diseases of the Ox.... ....8vo,	6 00
" Treatise on the Diseases of the Dog...............8vo,	3 50
Woodhull's Military Hygiene.......... ....16mo,	1 50
Worcester's Small Hospitals—Establishment and Maintenance, including Atkinson's Suggestions for Hospital Architecture.......................................12mo,	1 25